

NETWORK WORLD

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Net upgrade disrupts MCI 800 service

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. last week acknowledged that about 50 users of its 800 service recently experienced outages of up to several hours due to problems the carrier encountered while updating a data base that supports the service.

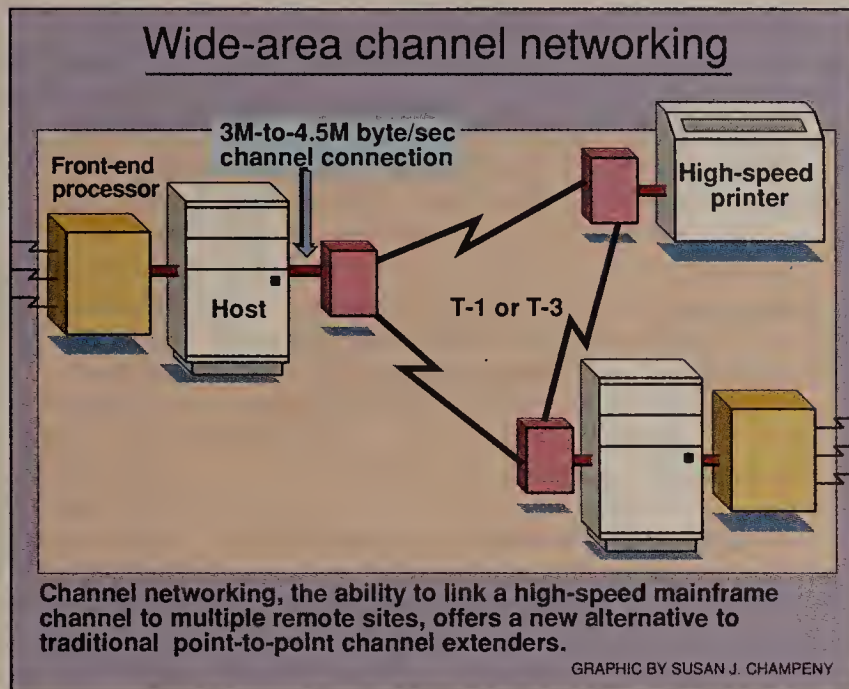
The failures occurred without warning and affected users across the country, temporarily paralyzing their telemarketing and customer service operations.

The problems began days after MCI suffered a severe outage when a lightning bolt struck an underground fiber cable running from Alabama to Florida. The line supported 36 T-3 circuits ("MCI gets zapped," *NW*, April 3).

MCI said the latest service problems were the result of a wide-sweeping 800 data base conversion process that was completed just over a week ago. "We were changing out our 800 data base and making changes [to equipment] needed to access this data base," said Daniel Crawford, senior vice-president of network operations for MCI.

MCI said it solved the data base-related service problems a few days after they began and is working to ensure that such problems do not arise in the future.

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Back-end nets link remote hosts at channel speeds

Evolution of technology, new applications and falling transmission costs spurring new trend.

By Jim Brown
New Products Editor

An increasing reliance on multiple data centers to support disaster recovery and distributed processing is driving the development of back-end networks that link IBM mainframe channels over high-speed, digital wide-area links.

Channel networking, a new twist on traditional point-to-point channel extension, is made possible by the declining costs of T-1 and T-3 lines and the advent of channel extender products that support network-routing capabilities.

This trend could enable com-

panies to distribute processing chores among multiple data centers — each supporting IBM mainframes — without bogging down a front-end processor, according to channel extender makers.

In addition, wide-area channel networking enables users to move mainframe operations from high-rent downtown office buildings to the suburbs while supporting channel-attached peripherals in the city.

"There is some movement from traditional point-to-point [channel extension] toward a networking environment that allows

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FCC's Patrick calls it quits as chairman

Submits resignation in wake of price cap victory, agrees to stay on until a successor is appointed.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Federal Communications Commission Chairman Dennis Patrick resigned last week but agreed to remain in the agency's top post until a successor is nominated and confirmed.

Patrick's resignation comes only three weeks after the agency voted to implement price cap regulation for AT&T. Price caps were a focal point of Patrick's efforts to lessen market regulation.

Analysts and attorneys here said it is unclear how Patrick's resignation and his lame-duck status will affect major issues pending before the FCC, but they said his resignation raises doubts about the outcome of AT&T's Tariffs 12 and 15, and price cap regulation for the local exchange carriers.

How those issues are ultimately resolved will depend on who President Bush appoints to fill the chairman's slot and two other existing FCC vacancies.

Although it was widely rumored that he would leave the FCC before the end of the year, Patrick said the White House has not yet considered a replacement. However, a source on Bush's transition team said the chairman's job will probably go

to either Alfred Sikes, assistant secretary of commerce and head of the National Telecommunications and Information Administration (NTIA), or Sherrie Marshall, former director of the FCC's office of legislative affairs, (continued on page 68)

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IBM offers new line of EDI products

By Jim Brown
New Products Editor

WHITE PLAINS, N.Y. — IBM last week introduced a series of electronic data interchange packages designed to make it easier for businesses to exchange electronic documents such as purchase orders and invoices.

IBM's DataInterchange Series products, which are available for its full line of processors, convert EDI documents from proprietary formats into standard EDI formats.

In conjunction with the product announcements, IBM said it intends to expand its own use of EDI by encouraging more than 2,000 of its suppliers to join its internal EDI network by 1991.

Analysts said the announcements show IBM is putting its full weight behind EDI.

"This is the strongest signal IBM could send to an emerging marketplace," said Sam Albert, vice-president at the Hartsdale, N.Y., office of Input, Inc., a mar-

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NETLINE



HP BEEFS UP its WAN strategy with new products and ties to T-1. Page 2.

DRESSER INDUSTRIES shares its experiences as an early user of Harris' multifunction Super-Net controller. Page 2.

IBM DIVES INTO the disaster recovery services mart. Page 4.

PARKER HANNIFIN will be an early user of AT&T's Definity 75/85 PBX. Page 4.

DG WIDENS ITS support for PC networks with a set of new products. Page 4.

SONY ROLLS OUT a two-way truck communications and tracking system. Page 6.

FEATURE



AT&T's UNMA set to manage SNA networks

By George Sackett
Special to Network World

Major communications and computer vendors traditionally have protected their proprietary networking environments as fiercely as feudal lords once protected their castles. Today, however, in response to users' demands for end-to-end multi-vendor network management, vendors are opening up their gates and enabling their products to communicate with competitors' products.

AT&T is the most recent example. Recognizing users' need for integrated voice/data network management, AT&T has provided, within its Unified Network Management Architecture (UNMA), a way to integrate an IBM Systems Network Architecture logical network with the physical telecommunications network.

AT&T accomplishes this integration through the Accumaster Integrator with the SNA

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HP to certify T-1 gear for use with its X.25 switches

HP also slated to introduce new X.25 switches, T-1 service program and net control options.

By John Cox
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. is slated to bolster its wide-area networking strategy today by announcing certification of T-1 gear to work with its X.25 packet switches, a new low-end switch and network management options.

Today's announcements will help customers integrate packet traffic into a T-1 backbone, extend private packet switching to smaller sites and increase network control of customers' packet networks, according to Robert Emerson, marketing manager for wide-area nets at HP, based here.

HP will guarantee compatibility between its HP X.25 Private Packet Network (PPN) switches and Network Equipment Technologies, Inc.'s Integrated Digital Network Exchange, Timeplex, Inc.'s Link Integrated Connectivity line and Digital Communications Associates, Inc.'s System 9000 T-1 multiplexers.

The company's compatibility test results will be made available to customers in the form of standard recommendations on how to adjust the operating parameters on both devices to optimize performance, according to Dan

O'Farrell, a consultant with HP's networking group.

As part of the certification program, HP will also announce service support for the multiplexers under its NetAssure program. Customers who opt for the service plan will be able to call on HP to fix nets that incorporate PPN and T-1 equipment. Under NetAssure, HP engineers will track T-1 problems and either remedy the fault or, in serious cases, work with the appropriate T-1 vendor. "Rather than reinvent the T-1 mux, we're just adding value in terms of service," Emerson said.

Hardware products to be announced include the low-end Model 45 packet switch, a low-cost multiprotocol switch based on the HP Vector PC microcomputer. It can be configured with four to 20 ports and supports IBM's Synchronous Data Link Control, asynchronous and binary synchronous protocols.

The new switch costs from \$7,000 to \$18,000, depending on configuration. It will be available in the second half of this year. The smallest PPN switch formerly available was the Model 60, an eight-port box that was priced at about \$14,000.

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Farm equipment maker opts for Harris' SuperNet

Firm can off-load processing from mainframes.

By Jim Brown
New Products Editor

DALLAS — Dresser Industries, Inc. last week said it is using a Harris Corp. SuperNet controller to link IBM 3270-type terminals and local network-attached IBM Personal Computers to mainframes in the corporation's data center.

The Fortune 500 industrial and farm equipment manufacturer is an early user of the SuperNet device, which can simultaneously support a myriad of communications functions. The unit has replaced a variety of equipment and, along with installation of the local networks, is helping Dresser off-load application processing from mainframes.

Dresser has configured the Unix-based unit, which was introduced last fall, to support four functions ("Harris unit supports LAN, cluster controller options," *NW*, Oct. 3, 1988). "We plan on using just about all the functions it makes available," said Don Curtis, Dresser's MIS manager.

First, the unit acts as an IBM 3174-compatible cluster control-

ler linking nine 3270-type terminals at corporate offices here to one of Dresser's mainframes in nearby Richardson, Texas. The SuperNet also acts as a local net-to-mainframe gateway, enabling 200 Personal Computers on six Novell, Inc. NetWare-based Ethernets to access data residing on any corporate host.

In addition, the device is configured as a print server, which allows Personal Computers to share expensive Xerox Corp. laser printers housed locally. The SuperNet also emulates an IBM remote job entry (RJE) workstation capable of submitting batch requests for large amounts of host-resident data.

The SuperNet device is linked to Dresser's Richardson data center via a 56K bit/sec leased line supporting IBM Systems Network Architecture protocols.

Easing up on hosts

By setting up personal computer networks and providing access to data on larger systems through SuperNet, Dresser is

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Briefs

IBM irks Rolm users. Members of the National Rolm Users Group last week turned out in record numbers at a Denver meeting to grill IBM and Siemens AG officials about private branch exchange product strategies and the soaring costs of switch maintenance contracts. About 125 Rolm users attended the meeting, the first since IBM sold its Rolm Systems Division to Siemens and the largest gathering since the group was formed in 1985.

Users asked Siemens officials to outline the company's future PBX plans, but the vendor skirted the issue, said one attendee who requested anonymity. "Siemens answered this question by saying they plan to offer the 9750 product line in the U.S. But they wouldn't say if the product line will include any switches other than the 9751," the user said.

The rising cost of IBM switch maintenance contracts was a topic of heated discussion at the meeting. "Large users are very upset over the huge increases. My contract increased 60% a year, even though my network stayed the same," the user said.

Servers with a smile. As expected, System One Corp. last week announced its Fare Assurance airfare analysis program, a travel agent application that resides on an IBM Token-Ring Network running OS/2 and SQL Server. SQL Server is the distributed data base management system from Microsoft Corp. and Ashton-Tate Corp. ("Travel net deploys SQL Server, PS/2s," *NW*, March 13). The Fare Assurance program helps travel agents working at IBM Personal System/2 workstations to recheck for lower fares after a reservation has been made by

searching all flights within the same time frame for a less expensive fare.

MCI looks for ISDN fans. In a wide-ranging discussion with the press last week, MCI Communications Corp. officials said they have yet to see a need for Integrated Services Digital Network offerings.

"We've done a major analysis, and we're trying to find someone who wants ISDN," said Richard Liebhaber, an MCI executive vice-president. Liebhaber said the economics of ISDN have failed to make it attractive to users. The Primary Rate Interface, which yields 23 voice circuits and one transport channel, is more expensive than a T-1 line that yields 24 channels, he said.

"The only application of ISDN I've seen that makes sense is [automatic number identification], and it doesn't make a lot of sense to me. I'm not sure if ANI is worth paying extra for," Liebhaber said.

MCI officials also said the company has successfully transformed its image from that of a discount carrier to a quality service provider.

"MCI used to be depicted as the K-Mart of the telephone industry: There was noise on the line, but the cost was 40% to 50% less," said Stuart Mencher, senior vice-president of marketing at MCI.

Amdahl ups FEP prices. Amdahl Corp. last week raised prices 10% on its 4745 front-end communications processors. The Amdahl 4745 Model 110 will cost \$100,500, up \$9,000. The Model 210 will cost \$132,000, up \$12,000.

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Data Communications

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Novell will boost its efforts to draw Apple Computer Macintosh users into the NetWare fold if it completes its proposed buy of Excelan this June. **Page 23**

Management Strategies

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can adjust your figures (optionally at your discretion) for what-if scenarios.

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Distributed Processing

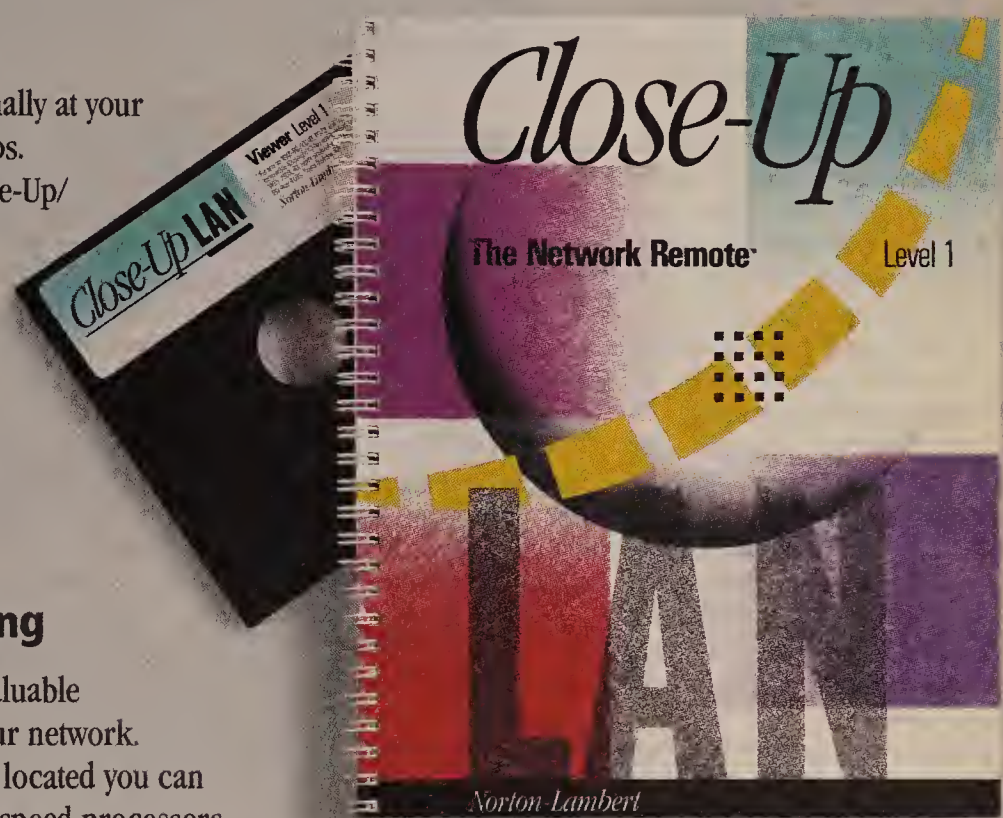
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IBM offers customers new disaster recovery services

Firm will phase in 14 hot sites throughout U.S.

By Bob Brown
Senior Writer

WHITE PLAINS, N.Y. — IBM last week announced its entrance into the disaster recovery services market, saying it will provide users with backup computer and communications facilities for use in emergency situations.

Through its Business Recovery Services, IBM will help customers with disaster recovery planning and provide access to backup computer and communications facilities, as well as technical support.

In an effort to meet customer-specific network needs, IBM will also place other vendors' communications equipment, such as T-1 multiplexers, at backup locations, or so-called hot sites.

The services will be available immediately for users of IBM's mid-range and mainframe systems, including Application System/400, System/36 and System/38 minicomputers and 3090 mainframes. IBM plans to phase in 14 hot sites, which will be located throughout the country.

It has been rumored for months that IBM would enter the disaster recovery business, which gained a great deal of national attention after the Illinois Bell Telephone Co. central office fire in Hinsdale, Ill., last May that crippled networks and data processing sites.

The recovery services market will take off in the next decade, according to analysts. Users spent an estimated \$200 million on disaster recovery services last

year, and that amount is expected to increase by 20% annually through 1995, according to The Ledgeway Group, Inc., a Lexington, Mass.-based market research and consulting firm.

IBM's offering

Big Blue currently has a backup site in Tampa, Fla., equipped with three mainframes and a large minicomputer that it will make available to customers, said

to report to the nearest IBM disaster support site. Once at the support center, the user would begin data processing and network operations according to a pretested disaster recovery plan prepared with IBM's help. IBM would also help the user repair or rebuild its existing facilities.

In the preparation stage, users will determine what types of communications links they will use to connect the backup data site to other sites on their network, Boyle said.

"Each network is unique, and the flexibility we will support is noteworthy," Boyle said. "We're offering a wide range of services for communications devices."

Because IBM is not prepared

Delaware Valley Disaster Recovery Information Exchange Group, Inc., a consortium for users of disaster recovery services, said IBM's entry into the market is good news for users and the disaster recovery services market as a whole.

"As many users of disaster recovery services as there are, there are many more who have ignored [such services]," he said. "Maybe IBM's emergence will turn a few heads."

Richard Vancil, director of market development at The Ledgeway Group, said growing user demand for disaster recovery services should allow IBM to be successful without hurting existing players. He said disaster recovery services will be a \$1 billion-plus industry by 1995.

Current leaders in the disaster recovery services market said IBM's entrance will legitimize disaster recovery services in the eyes of top-level executives at many user companies. Executives from Comdisco Disaster Recovery Services, Inc. and SunGard Data Systems, Inc., the market's two major players, said they expect their bottom lines to be helped by IBM's decision.

Both Comdisco and SunGard met with IBM to discuss its foray into the market. SunGard even tried to persuade IBM to work with it in a joint venture, said James Mann, SunGard's president, chairman and chief executive officer.

These market leaders, who account for about half of the hot-site business, said they have more experience than IBM in the market, which gives them a big advantage. They also have branched out to support computers made by a number of vendors, including Digital Equipment Corp. and Tandem Computers, Inc. □

IBM's entry is good news for users and the recovery services market as a whole, Bannan said.

▲▲▲

Jim Boyle, vice-president of service delivery and telecommunications services for IBM's National Service Division in Franklin Lakes, N.J. (see "IBM's Net Support is PacTel service legacy," page 9).

IBM will open a larger backup facility in Franklin Lakes later this year, said Boyle, who will oversee IBM's disaster recovery operations. IBM also has minicomputer backup operations in Atlanta and Detroit, and it will open numerous other sites around the country. The company's goal is to operate at least one such site in all 12 of its U.S. market regions, Boyle said.

In the event of a disaster, an IBM customer would be directed

yet to handle all users that want the services, the services will initially be offered to a limited number of customers with immediate needs, Boyle said.

IBM initially will assign about 100 employees to support disaster recovery services, which will be marketed through IBM's existing Marketing Services Group, he added.

IBM Business Recovery Services will be available for one-, three- and five-year periods. Prices will range from \$500 to more than \$10,000, depending on the size of a user's computers or data base, Boyle said.

Users applauded IBM's entry into the market.

Jack Bannan, president of the

DG devices will boost PC support in its local nets

By Laura DiDio
Senior Editor

CHICAGO — Data General Corp. is expected to unveil today a series of products that significantly increase support for personal computers in its local nets.

The announcements will include software that lets an Eclipse MV/1000 DC minicomputer act as a server for a network of personal computers, support for IBM Personal System/2 models in DG local nets and communications software that lets workstation users access applications and data base management systems on DG minicomputers.

Currently, DG enables personal computer users to access files and printers on its minicomputers, but they must emulate IBM 3270 terminals to do so. The new products will let users access files and printers by talking directly to a server instead of communicating

in emulation mode.

"DG's strategy is to provide greater integration of PCs with its minicomputers. These announcements help it to stay competitive with other mini vendors like DEC, HP and Wang," said Steve Wendler, senior analyst at Gartner Group, Inc. in Stamford, Conn.

Currently, DG's Personal Computer Integration (PC*I) local network enables users to access only basic file- and print-sharing services on DG minicomputers over a PC*I Ethernet or Starlan network.

DG is positioning its Eclipse MV/1000 minicomputer — introduced two weeks ago for \$8,150 — as a server to compete against Intel Corp. 80386-based systems.

Today, DG is expected to introduce a complete MV/PC*I server package, which includes

the minicomputer with 8M bytes of memory, MS-Net network operating system software, DG's AOS/VS proprietary operating system and a license for 16 users — at a price of \$18,200, said Chris Stone, DG group manager for Workgroup Computing.

"DG is positioning its MV line to compete on a price/performance basis against 386-based servers. And the price is right," Wendler said. "Both the MV server and a 25-MHz 386-based server cost between \$10,000 and \$12,000" for base hardware configurations, he added.

PS/2 support on PC*I

For the first time, DG will support operation of IBM Personal System/2 Models 50, 60, 70 and 80 as workstations on its PC*I local net.

The new software includes DG Infact, which lets personal computer users access a variety of data bases residing on MV servers across Ethernet or Starlan nets.

Comprehensive Electronic Office (CEO) Connection/LAN is another of the new software

packages. It is the local network version of DG's CEO software office automation package, which includes mail, filing, calendaring and word processing capabilities.

CEO Connection/LAN resides on both the personal computer and the MV server. It enables personal computer users to access CEO over the local network without requiring a separate asynchronous connection.

All of the new software products are expected to let users distribute applications between personal computers and the minicomputer/server; that is, pieces of the software will reside on both the workstation and the server.

The products will support DG's recently introduced Distributed Applications Architecture, a set of programming interfaces that let applications talk with one another no matter what computers they reside on in the network ("DG network strategy heralds standards," NW, March 27).

DG Infact is shipping now. It costs \$3,875 for the MV/1000 version. CEO Connection/LAN costs \$350. □

Early user signs on for Definity PBX

By Bob Wallace
Senior Editor

SMITHTOWN, N.Y. — Parker Hannifin Corp. will install a Definity 75/85 Communications System private branch exchange at a divisional site here next month, making it one of the first users of the new AT&T switch.

The Definity Generic 1, which will initially support 300 lines, will replace an aging, topped-out, AT&T Dimension 400 analog PBX and will anchor the company's Gull Electronic Systems Division's network.

As part of the project, AT&T will link an existing System 75 in a nearby building to the Generic 1 using fiber-optic cable installed by a subcontractor.

A new System 75 at a separate site will be hooked to the Generic 1 via a T-1 link.

Parker Hannifin will sell the Dimension switch.

"We determined that it would be more expensive to purchase a System 75 than to buy a Generic 1," said Jacqueline Schulli, director of corporate telecommunications for Parker Hannifin.

The Generic 1, slated for cut-over on May 23, will not switch data and will not be equipped with add-on systems such as voice mail or an automated attendant, according to Schulli.

Parker Hannifin, which manufactures automobile and aerospace parts, is one of 25 users taking part in a controlled introduction of the Definity switch, Schulli said. Loyola University of Chicago is also participating in the rollout.

AT&T introduced the Definity at the Communication Networks Conference and Exposition '89 in Washington, D.C. in February ("AT&T takes wraps off crossbred PBX," Feb. 13). The switch combines the architectures of the System 75 and System 85, and enables users to protect most of their investment in either type of PBX.

The Definity is offered in two models: the Generic 1, which can handle 100 to 1,600 lines, and the Generic 2, which can support as many as 30,000 lines.

The Generic 1 and Generic 2 use common hardware, including the same cabinets and the System 75's high-density line interfaces, which support eight digital or 16 analog connections.

A Generic 1 can be expanded to a two-cabinet system, with one cabinet housing the switch's common control, software and initial circuit packs and the other containing up to five more shelves of line interfaces.

At the switch announcement in February, E.G. DeNigris, (continued on page 70)



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Sony unveils 2-way truck communications system

By Paul Desmond
Staff Writer

NEW YORK — Sony Corp. of America last week became the second vendor to unveil a two-way truck communications and tracking system, a technology so effective in boosting productivity that some users believe it will be adopted by all trucking firms.

Sony's 2-Wayfarer Mobile Communication Unit uses radio signals to pinpoint the location of trucks, and it lets dispatchers and drivers communicate with one another via satellite links. This allows firms to keep constant tabs on shipments and make route changes at any time. Hughes Network Systems, Inc. announced a similar system in February.

The product improves upon Sony's earlier Wayfarer system, which only supported communications from a truck to a dispatch center.

Sony and Hughes Network Systems have offered one-way communications systems for about a year. Those systems have dramatically improved user productivity by providing accurate monitoring of loads and saving the time it takes drivers to stop and call dispatchers. Users said two-way capabilities build on that by giving dispatchers the ability to communicate with drivers, passing on any last-minute schedule changes.

Sony and Hughes Network Systems are the only vendors licensed to supply hardware that works with Washington, D.C.-based Geostar Corp.'s satellite network, which is used to transmit data between trucks and dispatch centers.

Sony's 2-Wayfarer system adds a Receiver/Interface Unit and an enlarged keyboard display to the original Wayfarer system, said Jerry Smith, vice-president of Sony's Radiodetermination Satellite System division. Two data ports on the Receiver/Interface Unit allow for the attachment of monitoring devices, such as one that can identify which trailer is attached to a truck and another that monitors and controls the climate in refrigerated trailers.

The unit also receives and decodes C-band satellite transmissions and relays them to the keyboard/display unit in the truck's cab, Smith said.

Dispatchers type in messages on a keyboard, enter a destination and send the message to Geostar's data center over telecommunications lines. Geostar uses a C-band link to send the transmission to its satellite, which beams it to the Receiver/Interface Unit, Smith said.

Over an L-band link, a frequency dedicated to mobile communications systems, an acknowledgment that the message

was received goes back to the dispatcher within 15 seconds, he said. L-band is also used when drivers send messages.

Besides the two-way messaging, both the Sony and Hughes products come with an antenna

that picks up radio signals from the government's Loran-C transmitters located throughout the country. The signals are used to triangulate a truck's location, and that data is also sent to the dispatcher via the satellite link.

The positioning data, combined with the ability to communicate with drivers at any time, is a powerful tool for companies that need to monitor shipments.

"I see it being revolutionary

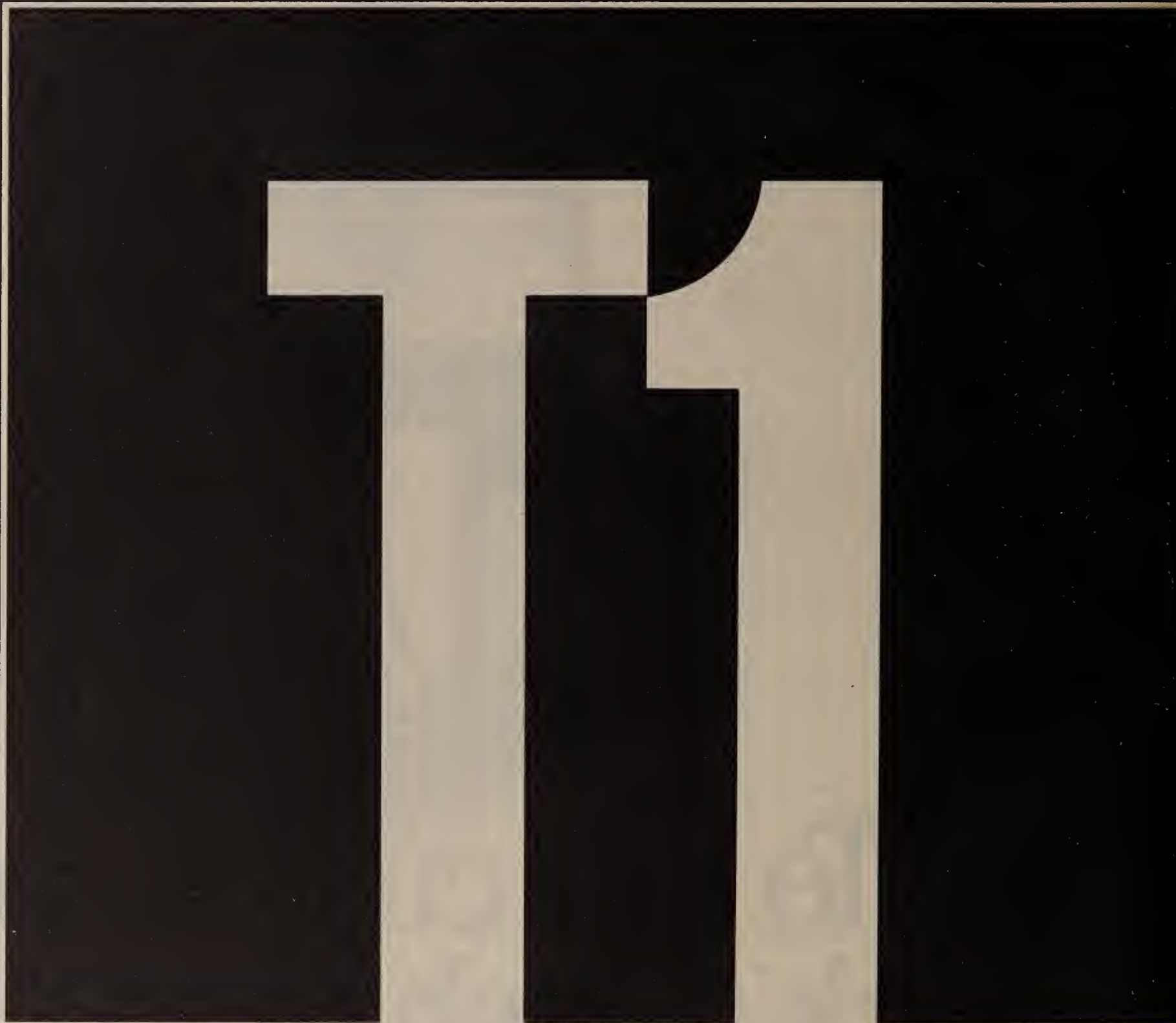
for the trucking industry," said Donna Marske, manager of communication technologies and agency services for St. Louis-based United Van Lines, Inc. "It's almost as if an extension of headquarters will be riding in the vehicle with [the driver]."

United Van Lines has been testing Sony's one-way system in 15 to 20 trucks for 15 months, Marske said. The company plans to install the system in more than

200 trucks by the end of the year and in up to 3,000 trucks over the next two to three years. United Van Lines will use the two-way system when it becomes available in September, she said.

Two-way communications will allow the company to accommodate last-minute pickups by finding a driver near the pickup area and relaying the schedule change, Marske said.

"If we had to wait two or three



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hours for [the driver] to call us, he could be 200 miles down the road and that opportunity is gone," she said.

As more trucking companies install tracking and communications systems, others will be forced to follow suit, Marske said.

"The competitiveness of the industry will force the big [trucking companies] to participate just to maintain a competitive edge," she said.

But the technology can also let a small company carve a niche for itself among larger competitors, as Trans-Western Express Ltd. (TWX) of Denver did with a Hughes system that lets it monitor the status of its refrigerated shipments ("Trucker gets an edge with tracking net," *NW*, Feb. 13).

Jeff Amen, assistant to the president at TWX, said he sees the tracking and communications

systems as a trend in the industry and said customers such as General Motors Corp. are demanding that their shippers have the systems.

"There are different branches of government right now that are requiring satellite tracking for their loads, like munitions and that type of thing," Amen said. "California is looking at requiring satellite tracking on any truck hauling hazardous materials." □

Oracle/Banyan server lets users access varied DBMSs

By Susan Breidenbach
West Coast Bureau Chief

BURLINGAME, Calif. — Oracle Corp. and Banyan Systems, Inc. said last week they will release next month a data base server that gives Banyan network

users access to data on a wide variety of systems.

Called Oracle Server for VINES, the product runs on top of the Banyan VINES/386 network operating system in an 80386-based server. In addition to acting as a data base server for attached local net workstations, it can provide access to Oracle relational data base management systems running on more than 80 mainframes, minicomputers and microcomputers.

Oracle DBMSs, including the new VINES version, can also communicate with IBM's DB2 mainframe relational DBMS.

Oracle Server for VINES was unveiled at a hastily organized press conference here last Tuesday. Oracle executives said privately they felt it was important to "make some kind of statement" to the market before the OS/2 SQL Server — codeveloped by Sybase, Inc., Microsoft Corp. and Ashton-Tate Corp. — ships on April 30.

SQL Server is data base management software that resides on a server in an OS/2 LAN Manager network.

Oracle Server for VINES is the first microcomputer implementation of Oracle Version 6, the latest release of the relational DBMS. Both the data base server and VINES/386 were designed specifically to take advantage of the 32-bit 80386 chip architecture.

The data base server does not require a dedicated VINES/386 server, but Banyan recommends a dual-server configuration for local networks running many data base applications.

Robert Bolt, a product marketing manager in Oracle's PC products division, said VINES is a good fit with Oracle because of its unique global naming service called StreetTalk, which uses distributed data base technology to provide wide-area addressing.

Oracle uses that facility to give users transparent access to data that is distributed across Oracle relational DBMSs running on a variety of machines. An end-user application launches a request to the data base server, and the server forwards any portion of the query it cannot fulfill to the appropriate relational DBMS on another machine, Bolt said.

That so-called "location transparency" — the ability to access corporate information without knowing where it resides — is key to Oracle's distributed data base strategy. The Oracle relational DBMS has been ported to most mainframes and minicomputers as well as some microcomputers. The various versions can be linked into a single corporatewide relational DBMS via Oracle's SQL*Star family of products.

(continued on page 69)



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*Datapro, *User Ratings of Network Management Systems*, September, 1988.

**International Data Corporation (IDC), *Quantitative Analysis of the Network Management Market*, October, 1988.

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Codex takes wraps off family of X.25 packet-switching products

Company details aggressive plan to capture market share.

By Paul Desmond
Staff Writer

CANTON, Mass. — Codex Corp. last week rolled out a new line of packet-switching products here, as expected, and discussed plans to capture 15% of the X.25 market within three years.

Codex announced two entry-level X.25 products — a switch and a packet assembler/disassembler — and said it will sell in domestic markets three high-end switches made by Hughes Network Systems, Inc.

that Codex currently markets outside the U.S. ("Codex pumps up net line with X.25 packet switches," *NW*, April 3).

The new products complement Codex's existing 6742 and 6745 Flexible Networking Exchanges (FNX) announced last September. Those hybrid statistical multiplexer/packet switches now make up the middle of the company's X.25 product line, said Marianne Cooley, director of data networks marketing for Codex.

Robert Stearns, vice-president of cor-

porate marketing and business development for Codex, said the company conservatively estimates it will capture 15% of the packet-switch market by 1992.

Stearns said Codex will attain its goal both at the expense of other vendors and by capitalizing on the compound annual growth rate in the market, which it projects to be 13%. Stearns said Codex has about 1% of the X.25 market today. "There are a lot of things that make packet switching attractive," Stearns said, including the migration toward standards, using X.25 services to feed T-1 networks and the use of packet switching to link incompatible electronic data interchange and electronic mail networks.

Analysts called the 13% market growth rate projection conservative and Codex's projected growth rate optimistic.

"I admire their zeal, but let's temper it by being realistic," said Jack Freeman, senior data communications analyst with The Yankee Group, a Boston-based consulting and research firm. "They're up against a lot of entrenched packet network system vendors."

Jeremy Frank, program director of enterprise network strategies at Gartner Group, Inc. in Stamford, Conn., said the 15% figure is optimistic, attainable only if Codex defines the X.25 market in terms of traditional vendors of packet switches and PADs. That market has become blurred because vendors such as IBM and Digital Equipment Corp. now build X.25 interfaces into their equipment.

Codex has sold two of its high-end 6600 Series switches, one in Europe and the other in Canada. The switches come in three models: the 6608, 6624 and 6690. They support from eight to 500 ports, as well as terminal and trunk speeds ranging from a maximum of 19.2K bit/sec for the 6608 to 64K bit/sec for the other models.

Codex plans to bring the 6600 Series under the umbrella of its high-end 9800 Network Management System, Cooley said. Until then, the 6600 can work with Hughes Network Systems' DEC MicroVAX-based system, which is also sold by Codex.

To address entry-level users, Codex introduced the 6525 X.25 Packet Switch, a six- to 48-port switch with an integrated



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SIECOR

Stearns said the company conservatively estimates it will capture 15% of the packet-switch market by 1992.

▲▲▲

PAD. That switch can also function as a feeder into a large X.25 backbone net.

The other entry-level offering, the 6505 PAD, is available in six-, 12-, 18- and 24-port configurations. One or two of the ports can be configured as trunks, with the remainder functioning as terminal ports.

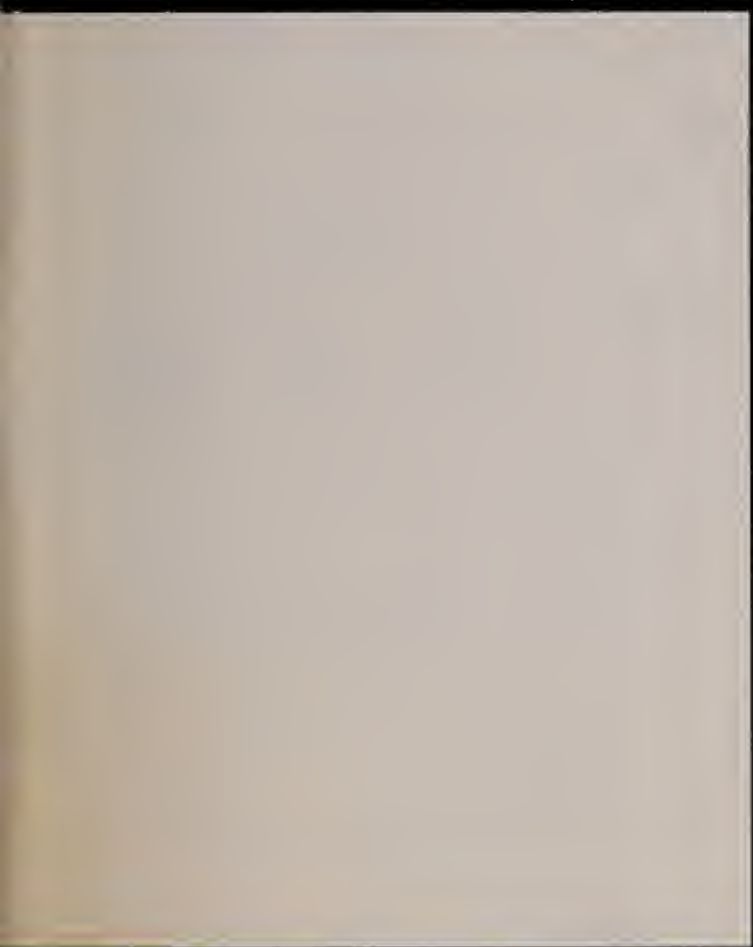
Both products support trunk speeds of 80K bit/sec and terminal port speeds up to 19.2K bit/sec. They can be managed by Codex's personal computer-based 9300 or its 9800 Network Management System, which is based on an Apollo Computer, Inc. workstation.

Codex has two beta users for its entry-level products, Cooley said, although she declined to name them.

Stearns said Codex is counting on its customer base to help it capture X.25 market share. However, Codex users said they are not yet willing to commit to buying Codex X.25 products solely because they use other Codex products. A user who said he is pleased with the 6745 FNX said that if his company decides to install X.25 equipment, he would not buy from Codex without checking the competition.

"We definitely do not want to rule out any of our options," said Paul Coleman, director of network implementation performance and recovery at New York Life Insurance Co. in New York.

Prices for the 6600 Series switches range from \$100,000 to \$250,000. The 6525 Packet Switch costs between \$4,345 and \$37,000, depending on configuration, and the 6505 PAD starts at \$1,995. All products will begin shipping by the end of the month. □





INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

IBM Personal Computers will make major inroads into Digital Equipment Corp. accounts, according to a new report titled "IBM vs. DEC, Why IBM will prevail in the 1990s." DEC's minicomputers are "a less than optimum solution for networked PC groups," said the report, which was prepared by The Sierra Group, a Tempe, Ariz.-based market research firm.

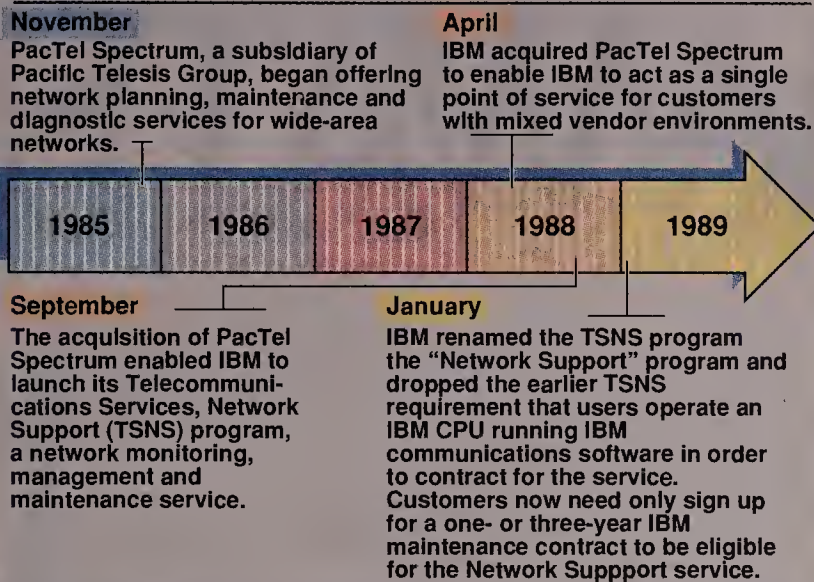
People & Positions

US Sprint Communications Co. of Kansas City, Mo., recently appointed **Lawrence Lake** to the newly created position of senior vice-president of product management.

Lake will be responsible for the development and marketing of all US Sprint products and services, including Integrated Services Digital Network products. Prior to joining US Sprint, Lake was vice-president of American Express Travel Related Services Co., where he directed the planning, engineering and implementation of worldwide voice and data networks.

Peter Bonee last week was named to the new position of vice-president of engineering for the San Jose, Calif., operations of **VMX, Inc.**, a voice-messaging and call-processing company with dual headquarters in Dallas and San Jose, Calif. Bonee's responsibilities will include all development related to VMX's Direct Access Link (DIAL) call-processing products and all engineering operations at the San Jose location. Bonee will report to David Ladd, VMX's executive vice-president for product development. □

Evolution of IBM Network Support program



IBM's Net Support is PacTel service legacy

Big Blue provides real-time response with remote monitoring, diagnostics, coordination of repairs.

By Gail Runnoe
Washington Correspondent

FRANKLIN LAKES, N.J. — Building on capabilities acquired through its purchase last year of PacTel Spectrum Services, IBM is aggressively marketing its own remote network monitoring and maintenance service to users of IBM and non-IBM networks.

IBM's Network Support service uses the same basic network monitoring and diagnostic technologies introduced by PacTel Spectrum Services in 1985, according to Jim Boyle, vice-president of service delivery and telecommunications services for IBM's National Service Division.

Network Support "gets the customer out of the finger-pointing game," IBM's Boyle said.

here. IBM acquired PacTel Spectrum Services from PacTel Communications Cos. in April 1988 (see graphic, this page).

Boyle said IBM has added value to the PacTel Spectrum Services offerings by augmenting them with IBM's vast customer service resources and technical data bases, which provide valuable network management information. One such data base is the Retain System, an on-line repository of solutions to common network problems that can be accessed by support personnel while at the user's site.

These resources, Boyle said, allow IBM to respond in real time to network problems uncovered by routine monitoring functions.

Many analysts said they believe IBM's aggressive marketing of Network Support shows the company's increasing flexibility in meeting users' service needs. They said the multivendor network management service will meet with greater success than when it was offered by its forerunner, PacTel Spectrum Services.

How it works

Introduced in January, Network Support provides users of multivendor networks with remote network monitoring, diagnostic testing for system malfunctions and repair coordination, Boyle said.

When diagnostic tests performed under Network Support show that a network malfunction is due to a problem with IBM equipment, Boyle said, IBM will dispatch a customer technician to service the unit. When non-IBM equipment is found to be at fault, IBM will contact the appropriate vendor to make the necessary repairs.

By coordinating the repair process in this way, Boyle said, Network Support "gets the customer out of the finger-pointing game" that often results when problems arise in multivendor networks.

The service can also be used in conjunction with IBM's NetView integrated net management system. Use of NetView eliminates the need to install monitoring equipment throughout a network and can lower the overall cost of the Network Support service.

(continued on page 12)

3Com, Japanese firm team to market 3+Open wares

Vendors demonstrate Japanese version of OS.

By Bob Brown
Senior Writer

TOKYO — 3Com Corp. of Santa Clara, Calif., last week joined forces with Soliton Systems K.K. here to sell Japanese versions of 3Com's network products, including 3+Open LAN Manager.

3Com and Soliton formed an independent business operation that will be headquartered here. Financial details of the joint venture were not disclosed.

The two companies also unveiled and demonstrated an early version of the first product they will market at Communications Show '89, a major Japanese trade show. The new product, called 3+Open Kanji LAN Manager, is a Japanese version of 3Com's 3+Open LAN Manager network operating system.

The Japanese version includes a user interface in Kanji, Japan's primary form of written communication. Kanji uses pictograms to symbolize words and phrases.

Soliton already sells a number of 3Com's domestic products — including 3+Open LAN Manager, gateway servers, routers and work group servers — in Japan.

Other companies that license LAN Manager from Microsoft Corp. also sell their domestic LAN Manager products in Japan, said Eric Benhamou, a 3Com vice-president and general manager of its Software Products Division.

The 3+Open Kanji LAN Manager system will be the core product in 3Com's 3+Open Kanji product line, which will work with Japanese standard personal computers, including the IBM Personal System/55 and NEC Information Systems, Inc. 9800, as well as IBM Personal Computer/AT-compatible computers.

Also, the new product will operate with all systems supported by the U.S. 3+Open product line, including the Apple Computer, Inc. Macintosh, IBM Personal Computer, Personal System/2 and compatibles, and 3Com's line of dedicated network servers and network adapters.

The Kanji products will be able to interconnect with 3Com's domestic versions, Benhamou said. The products are entering the beta-test stage and will be available this summer. Pricing information (continued on page 12)

INDUSTRY BRIEFS

SouthernNet USA of Atlanta last week announced it has signed an agreement to acquire the long-distance operations of **Institutional Communications Co. (ICC)** of McLean, Va.

ICC provides private-line telecommunications services to customers in the District of Columbia, northern Virginia and suburban Maryland.

The acquisition agreement calls for SouthernNet USA to make a cash purchase of ICC's customer accounts. Financial terms of the deal were not disclosed.

ICC, which operates a 135-mile fiber-optic network, said it will now be able to concentrate on its core business of dedicated local telecommunications services.

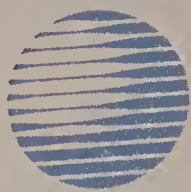
SouthernNet USA, which operates a 2,200-mile fiber network in 10 Southeastern states, is a subsidiary of one of the country's largest long-distance companies, Telecom*USA, Inc.

AT&T said last week it will increase from 60% to 85% its stake in **AT&T Network Systems International BV**, the joint venture it formed with **N.V. Philips** of the Netherlands in 1984. The amount AT&T will pay for the additional 25% share of the joint venture was not disclosed. The agreement was made in the interest of "facilitating the addition of other European partners to AT&T Network Systems International," AT&T said.

Dynatech Communications, Inc. of Woodbridge, Va., has been chosen by the Societe Internationale des Telecommunications Aeronautiques (SITA) to supply network management systems to service its worldwide needs.

Dynatech Communications will supply SITA with high-speed electronic matrix switches and performance measurement equipment. SITA is a cooperative organization of airlines that provides a shared communications network throughout 180 countries and territories. It services more than 340 airlines. □

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IBM Network Support program checklist

IBM's Network Support service includes:

- ☒ **Basic troubleshooting services.**
IBM will identify network faults involving both IBM and non-IBM equipment.
- ☒ **Remote monitoring and control services.**
IBM will monitor network functions by installing remote diagnostic computers and probes connected to one of their Network Support Centers (NSC). Using diagnostic tools at the NSC, IBM can locate the faulty device and disconnect it remotely.
- ☒ **Coordination of repair process.**
IBM will contact the appropriate vendor to make the repair and will work with repair staff to coordinate the repair process.

SOURCE: IBM NATIONAL SERVICE DIVISION, FRANKLIN LAKES, N.J.
GRAPHIC BY SUSAN J. CHAMPENY

IBM's Net Support is PacTel service legacy

continued from page 9

David Van Osdol, senior data communications analyst at ASK Computer Systems, Inc. in Los Altos, Calif., said IBM's repair performance has been exceptional since the company took over ASK's PacTel Spectrum Services contract last year.

When one of the network monitoring units provided by PacTel Spectrum Services failed recently, an IBM customer engineer arrived at the site within two hours to repair the unit, Van Osdol said. "Other companies might have taken a day to get someone out to us," he said.

ASK provides computer time-sharing and software services to electronics manufacturers across the U.S. The company's

network is based on Hewlett-Packard Co. and Digital Equipment Corp. computers, Anderson Jacobson, Inc. modems and Timeplex, Inc. multiplexers.

Because ASK does not operate any IBM equipment, Van Osdol said he initially feared that network support service would suffer when IBM purchased PacTel Spectrum Services. Expecting large numbers of existing IBM customers to subscribe to Network Support, he felt the service would soon be overloaded, causing non-IBM customers to be ignored.

But that hasn't happened, according to Van Osdol. "IBM has been trying to maintain their responsiveness to customers," he said.

Most analysts said they believe the Network Support offering will be profitable for IBM.

Jeff Kaplan, director of The Ledgeway Group, Inc., a Lexington, Mass.-based market research firm, said the service will enable IBM to become "a primary support agent" capable of supporting all network users. The ability to operate in multivendor environments is important "because of the direction the industry is taking today," he said.

Doug McLeod, senior analyst at International Data Corp., a market research firm based in Framingham, Mass., predicted IBM will be more successful in marketing a multivendor network management service than PacTel Spectrum Services was "because IBM has more marketing savvy."

One sign of IBM's growing flexibility has been the liberalization of requirements for subscription to the Network Support service, according to an IBM spokesman.

When IBM first introduced the PacTel Spectrum Services capabilities in its Telecommunications Services, Network Support (TSNS) program last September, users were required to have at least one IBM CPU running IBM communications software. In addition, they had to sign a one- or three-year IBM maintenance contract to qualify for the service ("IBM offers multivendor network control and maintenance service," *NW*, Sept. 26, 1988).

Now, under the Network Support program, customers do not need to operate any IBM equipment. Users must commit to a maintenance contract to purchase the network management service. **■**

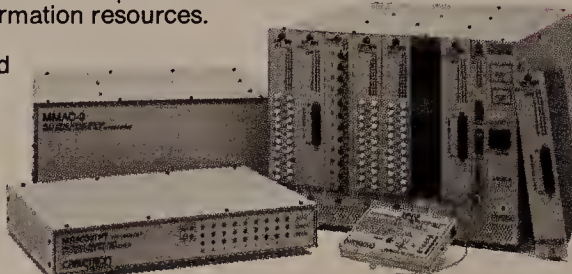
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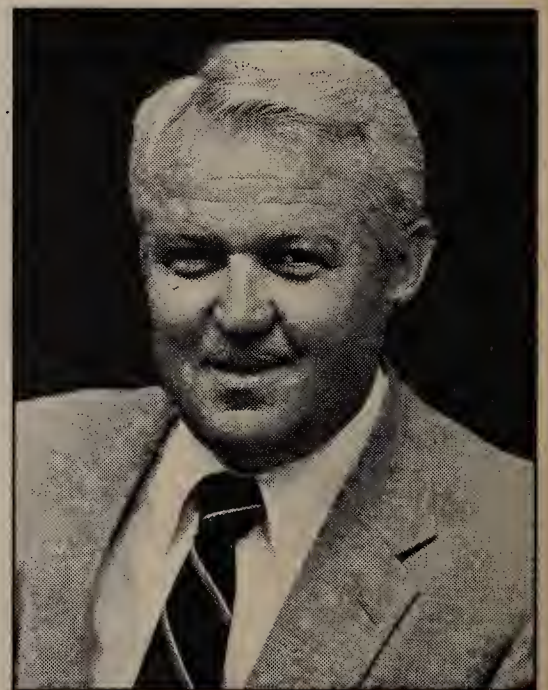


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IBM's Jim Boyle

3Com, Japanese firm to market wares

continued from page 9

mation will be available in late spring, he said.

3Com plans to announce Kanji versions of its other products, such as 3+ Open Mail, later this year.

The new products should prove to be attractive to 3Com's major accounts that require communications between offices in Japan and other countries, Benhamou said.

"In this global economy, we are seeing more and more work group-to-work group communications between the Japanese and the U.S.," he said. "This product will allow communications in a homogeneous fashion."

According to Nobuo Kamata, Soliton's president, there is a growing interest in networking among his company's customers. "That interest has been stymied because there has been no software support," he said. **■**

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Worth Noting

The seven regional Bell holding companies together invested \$815 million in Bell Communications Research, Inc. in 1988 for research into revenue-generating and cost-reducing technologies, according to BELLCORE.

Carrier Watch

Pacific Bell Telephone and Telegraph Co. last week announced a Message Center service that enables customers to send, receive, save and forward telephone messages.

The service, which will initially be offered in Milpitas and San Pedro, Calif., offers two features, Call Answering and Local Messaging.

The features can be ordered separately.

With Call Answering, the Pacific Bell Message Center answers customers' phones when they are away or when their phone is busy. The caller hears a short greeting in the called party's voice and can then leave a message.

With Local Messaging, users send messages to other users through the Message Center without calling recipients directly. Messages may be sent to individuals or groups.

A stuttered dial tone alerts users that they have messages, which can be retrieved from any push button-type telephone. Customers retrieve messages by calling in and entering a four- to 15-digit password.

After a message is retrieved, it can be erased, saved, or copied and passed to another Message Center user. The user can respond to a message by pressing a number on the telephone.

Customers who sign up for the service this month will not have to pay the usual \$15 installation fee. Monthly rates for the Call Answering feature range from \$12 to \$15.

Customers can sign up for
(continued on page 14)

DEC details its experience installing a global T-1 net

Company finds largest hurdle is net support.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — Given the chance to do it over again, Digital Equipment Corp. said it would take a different approach to the complex project of designing, building and running its international T-1 network.

This time around, the company would budget more money for network support, develop a detailed network management strategy and seek assistance in locating skilled technicians to maintain the network.

DEC detailed its T-1 networking experiences in a presentation delivered to 150 users from 40 corporations and organizations attending a recent meeting of the Independent T-1 Users Association here.

"We have learned many lessons, and there are issues we are still wrestling with," said Robert McCauley, corporate telecommunications manager for the minicomputer vendor.

DEC's international T-1 backbone includes more than 100 T-1s in the West and Southeast, a 180M bit/sec fiber net serving

DEC sites in New England, and satellite links to locations in the UK, Ireland, Europe and the Middle East. Fractional T-1 service serves DEC sites in Puerto Rico and the Far East.

The network serves as the foundation for DEC's 16-node international voice Electronic Tandem Network (ETN) and its U.S. data network. In addition, it supports high-bandwidth ad hoc applications such as videoconferencing.

The ETN, named Digital Telephone Network (DTN), carries about 15 million minutes of voice traffic a month. DTN supports 100,000 stations and provides seven-digit dialing for DEC employees at 370 sites worldwide.

Learning from mistakes

McCauley said lessons DEC learned about net planning and service reliability might be of use to other organizations trying to plan and implement T-1 nets.

McCauley said users tend to sell networking projects based on specific applications or cost savings and don't spend enough time
(continued on page 14)

WASHINGTON UPDATE

BY ANITA TAFF

Tariff 12 vote delayed. The Federal Communications Commission last week postponed voting on the legality of Tariff 12 until April 12.

FCC Chairman Dennis Patrick had scheduled for April 4 a special meeting at which the commissioners were expected to reach a decision on the tariff. Tariff 12 allows AT&T to bundle voice and data services together for discounted prices. However, the evening before the meeting was to take place, Patrick postponed the vote at the request of FCC Commissioner James Quello.

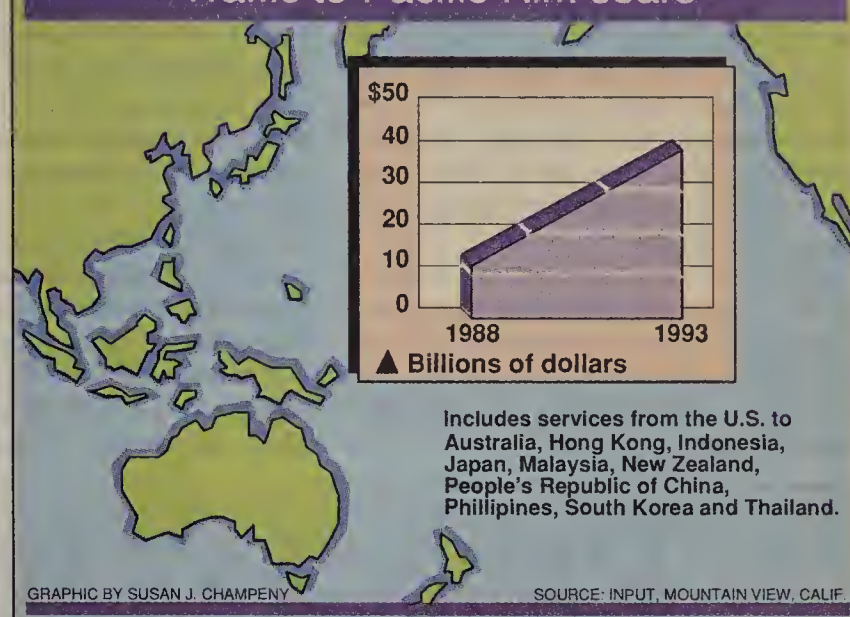
MCI still criticizing FTS 2000 award. MCI Communications Corp. continued its criticism of AT&T's winning bid in the Federal Telecommunications System (FTS) 2000 contract. At a press briefing in Washington, D.C., William McGowan, chairman of MCI, said the company is looking closely at AT&T's FTS 2000 rates to determine if the carrier's pricing is below cost. AT&T's rates were filed publicly for the first time earlier this month.

"In their panic to be a party to FTS 2000, AT&T may have priced services below cost," McGowan said.

If the tariff is underpriced in a predatory manner, AT&T's FTS 2000 offering would be illegal and there would be grounds for reversing AT&T's award, he said. McGowan questioned why AT&T wanted to keep its prices for FTS 2000 secret if there is no question of predatory pricing.

AT&T told the FCC it wanted to keep its rates secret because US Sprint Communications Co., the other winning FTS 2000 vendor, does not have to file its rates and that would put AT&T at a disadvantage when the bidding is reopened in the
(continued on page 15)

Traffic to Pacific Rim soars



Standards fray hurts European net efforts

Disagreement over equipment, service standards jeopardizing 1992 creation of int'l net, report says.

By Gail Runnoe
Washington Correspondent

CAMBRIDGE, England — Europe's efforts to create an international telecommunications network by 1992 are being jeopardized by disagreements over equipment and service standards, according to a report released here last week by Analysys Ltd.

According to the study, "Chaotic divisions between national networks over standards, technology and regulation" will prevent many European countries from being able to offer advanced telecommunications services such as Integrated Services Digital Network offerings.

The report, titled "European Telecommunications 1: Standards and Open Network Provision — Keys to the Open Market," details how the 12 countries in the European Community (EC) began work in 1987 to develop a regulatory framework for creating a continentwide network with common standards.

That effort, however, is stumbling.

Only four EC members — France, West Germany, Italy and the UK — are working to coordinate international signaling, according to Tim Hills, editor of multiclient studies at Analysys. "If ISDN is going to be a success in Europe, it has to be done internationally," Hills said, adding that advanced signaling capabilities will have to be available in all countries.

As a result, these four countries will be able to provide services such as ISDN before other European countries, creating two tiers of international telecommunications. This will slow eco-

nomic growth, Hills said.

One reason coordination efforts have fallen short is that national governments often appoint members of their monopoly telecommunications administration to the EC commission working on continentwide standards.

Telecommunications administrations often resist the adoption of standards designed to allow private communications companies to compete on equal terms with the services provided by the government, according to Hills. "[Telecommunications administrations] are the last people

"If ISDN is going to be a success in Europe, it has to be done internationally."

who should be setting policy for what their competitors can do," he said.

The Analysys report urges the EC to create an independent European regulatory authority to provide the commercial, legal and technical framework necessary for European telecommunications services to develop.

Governments, manufacturers and users currently use the European Court of Justice, Hills said, to arbitrate telecommunications disputes. The court is ill-suited for this type of function, he added. ■

DEC details experience installing T-1 net

continued from page 13

calculating total costs. "We did a good job on [budgeting] for the equipment and T-1s, but we seriously underestimated what it would take to manage and support the network," he said.

Similarly, data traffic should be considered carefully when planning a T-1 network. Looking back, McCauley said his group paid little attention to data traffic when justifying the network and projecting future savings.

"I wish we had planned the network based on voice and data from the outset. We designed most of the facilities based on our voice requirements because that was what consumed the most bandwidth," McCauley said.

Before McCauley and his staff designed the T-1 net, DEC's bandwidth management group assessed the telecommunications and data processing groups' requirements and what facilities they needed. "The departments did their design based on traffic and technology. They then determined where they needed circuits and placed orders with the transmission group," he added.

But even with those projected traffic increases, planning network growth has proven to be a problem. Because DEC is a fast-growing, decentralized corporation that runs a large number of distributed applications, it's difficult to forecast future needs accurately, McCauley said. "We

don't do a very good job of identifying and forecasting where the demand is coming from."

Building support

Although planning for traffic increases in itself is a tall task, it's not the toughest one DEC faces.

"The biggest challenge we face entering the 1990s is how to build the organization needed to support the network. There is a [major] shortage of qualified people," McCauley said.

DEC wants to deploy platoons of highly skilled network support technicians around the globe but has had only limited success finding them.

"It's easy enough to attract telecommunications [technicians] to eastern Massachusetts, but it's a lot tougher to staff up

in Dallas, in France and in other countries," McCauley said.

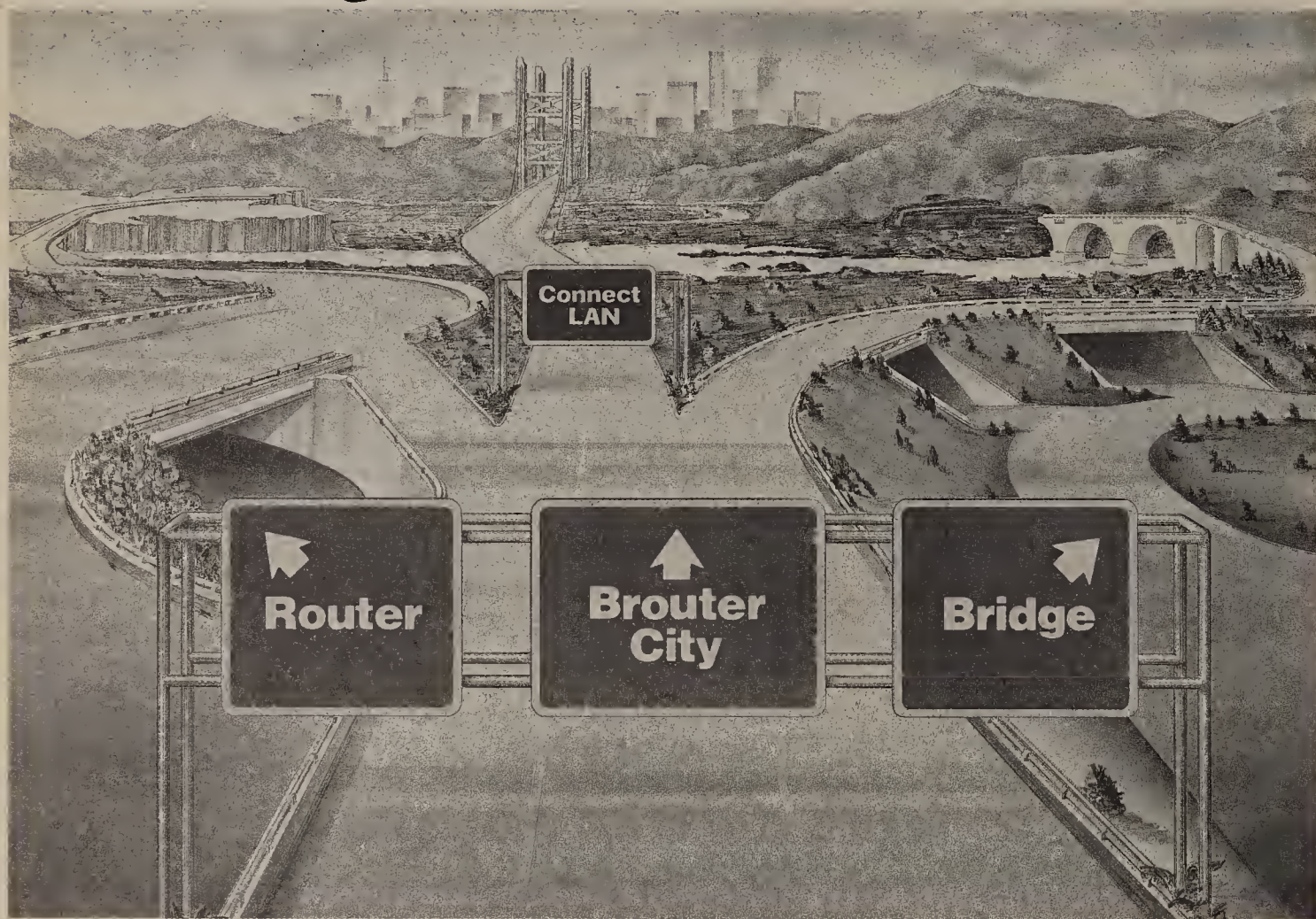
McCauley said his group paid little attention to the issue of T-1 network management. "Network management was an afterthought. We just did what we had to do to get the network up and running," he said. This has created problems for DEC, which is looking to integrate T-1 network management.

DEC uses several different network management systems to oversee the operation of its T-1 network and currently must cross-train its technicians. "We've made some progress. Our data network people, our voice network people and our transmission net people all sit in the same room and use a common trouble-tracking system," McCauley said.

Service reliability

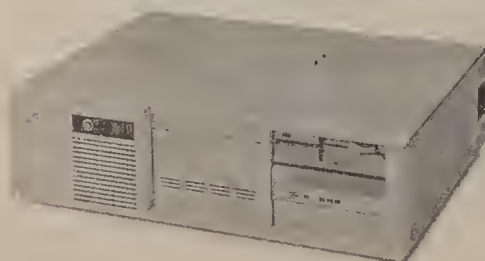
Although consolidating traffic on the network did increase net efficiency and boost savings, it posed problems for the network designer, according to McCauley. "As we concentrate more and more circuits into an integrated T-1 network, the network becomes much more vulnerable if there is an outage or some other type of disruption," he said.

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"The biggest challenge we face in the 1990s is how to build the support organization for the net," McCauley said.

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McCauley's group recognized this key issue and acted accordingly, designing network routes with redundancy and alternate routing. "If a T-1 fails or a [network switch] goes down, we can still provide a high level of service," he said.

McCauley pointed to DEC's private fiber network as an example of his group's drive for network support. The company bought and installed 190 route miles of fiber-optic cable and associated electronics to form a high-speed network serving a high concentration of DEC offices in Massachusetts and southern New Hampshire.

DEC contracted with Nynex Corp.'s service and support group to maintain the network because it felt the firm's service group, which is bigger than DEC's, could perform the task less expensively and more efficiently, McCauley said. "If needed, they can call on other parts of Nynex, including New England Telephone [and Telegraph Co.] to help get us back on the air if we do have [an outage]." □

Carrier Watch

continued from page 13

Local Messaging and receive messages at no charge, but they will be charged 25 cents for the first message sent via the Message Center and 15 cents for each additional message.

During the services' introduction this month, customers will be able to send messages under Local Messaging at no charge. Customers can save messages in the Message Center free of charge for 24 hours, but thereafter they must pay 5 cents per message per day.

There is no charge levied on messages waiting to be picked up. □

REVIEW

BY SARAH VANDERSHAF

Eliminating unnecessary telecom costs

"The Telecommunication Manager's (Plain English) Guide to Telecom Cost Control," written by Bruce Thatcher, president of TelCon Associates in Kansas City, Mo.

"The Telecommunication Manager's (Plain English) Guide to Telecom Cost Control," a recently published report, is designed to help telecommunications managers save money by identifying and eliminating unnecessary costs.

The report, published by Management Telecommunications Publishing, outlines three main causes of excess charges: inefficiently set up services, billing errors and unauthorized use by telephone users.

Most excess costs are caused by inefficient services, according to the report. Deregulation has contributed to ineffi-

Most excess costs are caused by inefficient services, according to the report.

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ciency by giving vendors an incentive to sell unnecessary equipment and procrastinate in processing orders to take lines out of service, the report said.

Billing errors are another common source of unnecessary expense. In a three-year study, TelCon Associates found that nearly 80% of its clients were incorrectly billed.

Phone abuse, employees using company facilities to dial 900 numbers or make personal calls, can also be expensive for employers.

To deal with chronic abuse, the report suggests a rather unorthodox approach: Instruct the telephone company to remove unauthorized calls from phone bills. The phone company may then try to apply the charge to the called party. Even if the charge does not stick, such action can discourage repeat misuse.

Money-saving new technologies are also covered in the report. Voice conferencing, teleconferencing, electronic mail networks and videotex are among the options for saving on expenses.

The report also contains advice on improving employee efficiency with such telecommunications system features as speed dialing.

The report is available for \$225 from Management Telecommunications Publishing, 650 Avenue of the Americas, New York, N.Y. 10011; (212) 627-4747. □

Washington Update

continued from page 13

fourth and seventh years of the contract.

800 service enhancements.

MCI also announced the commercial availability of several 800 service enhancements at the press briefing. The four new 800 calling features are:

- The ability to route calls to locations based on the time of day or day of week.
- The ability to receive 800 calls from areas outside the U.S.
- Alternate routing for locations that are unable to accept calls.
- An overflow feature that allows customers using dedicated access lines to route calls automatically to a second location when the primary location is busy.

The carrier also announced it has completed installation of Common Channel Signaling System 7 (CCS7) throughout its nationwide network. According to Richard Liebhaber, executive vice-president at MCI, implementation of CCS7 enables the company to serve large corporate customers better by improving network efficiency and reducing call setup time by 40%.

Tariff 16 questioned. In other news, MCI last week asked the full FCC to reconsider the Common Carrier Bureau's decision to allow AT&T's first Tariff 16 offering to go into effect without an investigation. That tariff gives military bases in Oahu, Hawaii, outbound calling service to the U.S. mainland, Puerto Rico, Guam and the U.S. Virgin Islands.

MCI claims that Tariff 16, which is for

government-specific deals procured under competitive bid, raises significant legal questions.

MCI said that even though the Communications Act of 1934 gives the FCC authority to allow special rates and conditions for government users, it does not allow the FCC to single out one group of government users for different treatment.

The carrier even suggested that AT&T should be required to accommodate all government users under a single tariff; currently, special government services are provided under Tariffs 9, 12 and 16.

The FCC commissioners should review the bureau's decision, MCI said, because of these legal questions and because the bureau did not provide any evidence or explanation of why it allowed AT&T to proceed with Tariff 16 offerings. □



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Worth Noting

“Once the spread of ISDN becomes exponential, tariffs, hardware costs, and everything involved with it will come down. It’ll be like the calculator business 10 years ago.”

Fred Chanowski
President
TMCA Computer Task Group, Inc.
Needham, Mass.

Data Packets

Micom Communications Corp. last week said it has bolstered its line of Micom Box statistical multiplexers with data compression software.

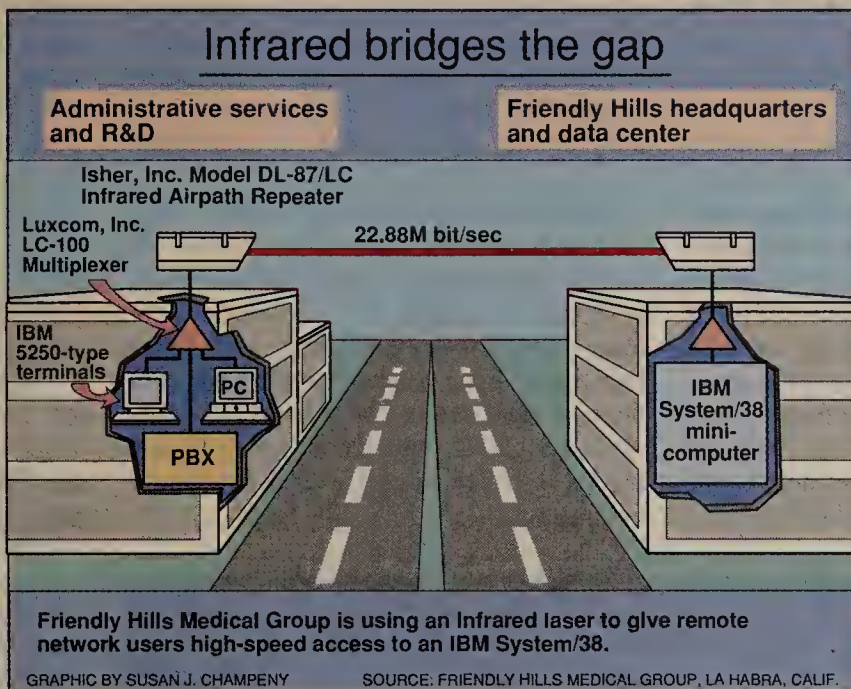
The new software, called Fast Statistical Multiplexer, or Fast Stat, compresses asynchronous or synchronous data, allowing more data to be transmitted using less bandwidth than previous Micom Box models.

Company officials said tests by an independent testing firm showed that using Fast Stat with a 9.6K bit/sec line boosted the line’s effective performance to almost 19K bit/sec. Fast Stat also eliminated the store-and-forward delays traditionally associated with multiplexers.

The result, according to Oliver Stacey, Micom’s director of marketing for wide-area network products, is improved synchronous transmission performance in IBM environments because the multiplexer can keep up with a front-end processor’s polling schedule.

Fast Stat is available now for the Micom Box Types 2, 3 and 5. The software supports up to 16 asynchronous channels on the Types 2 and 3, and up to 32 synchronous or asynchronous channels on the Type 5. Prices range from \$2,040 to \$7,870.

Micom is located at 4100 Los Angeles Ave., Simi Valley, Calif. 93063, or call (805) 583-8600. ☐



Medical group picks laser for high-speed connection

Firm links two buildings with infrared lasers.

By Paul Desmond
Staff Writer

LA HABRA, Calif. — A health care group here is using a laser bypass link to tie an IBM mini-computer in one building to a group of workstation users in a nearby building, creating a network that gives remote devices the same response time as those attached locally.

Cramped quarters forced Friendly Hills Medical Group to relocate its application development staff to a site across a four-lane highway. After exploring microwave, T-1 and other ways to support the group, the firm found that infrared lasers could meet its high-speed data transmission requirements at a fraction of the cost of the alternatives.

Friendly Hills installed Isher, Inc.’s Model DL-87/LC Infrared Airpath Repeaters at both sites, gaining more than 22M bit/sec of bandwidth, said Chris Turner, program manager for the firm.

Growing with IBM

Each transceiver is linked to a Luxcom, Inc. LC-100 Multiplexer, a device that was modified to support the Isher repeaters and is typically used with fiber-optic or coaxial cable, Turner said. The multiplexers are attached to Friendly Hills’ IBM System/38 minicomputer and, at the other end, support an array of System/38 5250 terminals and personal computers emulating those devices, he said.

“The response time that I get with these infrared devices is exactly the same as I have in a local environment,” Turner said.

The Luxcom LC-100 Multiplexer also supports token-ring links, a feature Friendly Hills will utilize when it replaces its System/38 with two IBM Application System/400 minicomputers later

this month to meet the demands of its expanding user base. Later this year, the Luxcom LC-100 Multiplexer will be outfitted with a T-1 interface to support voice communications between the buildings, Turner said, enabling the company to cut loose its leased tie lines.

The losers

Leased T-1 lines were just one of the alternatives Turner rejected before deciding on infrared laser technology.

Although the 56K bit/sec channels within a T-1 link would have provided sufficient response time to meet the needs of his program developers, Turner said the initial installation and equipment cost of \$8,500 plus the monthly leased-line fee of \$1,500 were prohibitive.

The company also rejected microwave because of its cost, which Turner put at roughly \$80,000. Another factor that weighed against microwave was the time involved in securing a Federal Communications Commission license.

Running a coaxial link between the buildings was out of the question because Friendly Hills does not own either building and did not have a right-of-way, Turner said.

The Isher and Luxcom equipment does not require an FCC license and, for Friendly Hills’ implementation, carried a onetime cost of about \$50,000, he said. It has worked so well that Turner plans to move additional users to the remote location.

In addition to providing a high-speed link, infrared is reliable in most any type of weather, Turner said. “The rule of thumb is that as long as you can see your target site, then you will have no problem,” he said. ☐

ISDN use hinges on applications, traffic

Determining whether ISDN will be better than local analog leased lines requires a crystal ball.

By John Cox
Senior Editor

FRAMINGHAM, Mass. — The advent of local Integrated Services Digital Network offerings will push users to consider these fast switched digital facilities as alternatives for dedicated analog lines.

But while ISDN Basic Rate Interface lines will make sense for some data communications needs, they are unlikely to obviate the need for dedicated connections, according to industry analysts and Bell operating company officials.

“Everything we’re going to do with ISDN is going to be usage-sensitive,” said James Devine, director of ISDN planning and marketing at Ameritech Services, Inc., a subsidiary of Ameritech. “For high [traffic] volumes, ISDN isn’t going to be cost-effective. For certain applications, it will be more cost-effective for a customer to have private lines.”

Unquestioned potential

The data communications potential of ISDN services offered by local exchange carriers is ap-

parent. A single Basic Rate Interface 2B+D line supports two 64K bit/sec circuit- or packet-switched bearer channels for voice or data traffic, and a 16K bit/sec packet-switched data channel for signaling information.

By comparison, analog leased lines can only support speeds up to 19.2K bit/sec and are typically used only at 9.6K or 14.4K bit/sec.

“ISDN increases the availability of digital services and also increases the line speeds,” said Rich Madrid, Ameritech Services’ manager of ISDN data applications.

But trying to figure out where ISDN will be a suitable data transmission alternative to local analog leased lines requires a blend of traditional pricing analysis tools and, according to some analysts, a crystal ball.

“The current [ISDN] tariffs aren’t much help,” said Mary Johnston, a principal with Northeast Consulting Resources, Inc., a Boston consulting collaborative specializing in management and (continued on page 21)

Sun, Cray cooperate in joint development effort

By Paul Desmond
Staff Writer

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. and Cray Research, Inc. recently announced a strategic alliance and the first fruit of that relationship, a Sun workstation-based gateway linking Cray supercomputers to Ethernet local networks.

Terms of the agreement call for Cray to participate in Sun’s Strategic Industry Partners Program, for the companies to integrate Cray and Sun products, and for them to jointly develop new products for mutual customers.

The companies’ first joint product, the Cray FEI-3 channel adapter and driver software, enables a Sun workstation to link four Ethernets supporting an array of devices to a 100M bit/sec Cray channel.

Besides giving engineers and programmers high-speed access to Cray supercomputers, the gateway can support high-speed serial links for wide-area net connections with the Cray, said Gor-

don Stitt, Strategic Industry Partners Program manager for Sun.

The FEI-3 is a two-board set that fits into the VME bus of Sun-3 or Sun-4 workstations, Stitt said. The FEI-3 is designed to offer users a lower priced alternative to products from Digital Equipment Corp. and IBM that use a VAX minicomputer or an IBM mainframe as a gateway to the Cray supercomputer, Stitt said.

Operating under the SunOS operating system, the drivers enable devices attached to a Transmission Control Protocol/Internet Protocol-based Ethernet to access the Cray.

The connection lets workstation users open Cray and Sun windows simultaneously, Stitt said. “It gives truly interactive, transparent access into the Cray environment,” he added. That feature is important for Cray users who are constantly writing and editing complicated applications, such as those in the aerospace, automotive and oil industries.

(continued on page 20)

X.400 messaging protocol slated for healthy international growth

Report says technology will be widely accepted by 1994.

IDG International News Service

PARIS — By 1994, about 500,000 personal computers and 150,000 large systems will communicate using the X.400 messaging protocol, according to a recent study of U.S. and European markets.

At that point, X.400 usage will have reached a critical mass, making it easier to attract new users, according to "X.400 Markets: the Users Decide," a report prepared by Ovum Ltd., a London-based market research firm. "If X.400 is successful,

there will be little need to justify connection into the X.400 community in 10 years' time. It will become a business necessity, like the telephone today," the study said.

X.400 is used mainly to interconnect private electronic mail systems, such as IBM's Professional Office System and the mail system in Digital Equipment Corp.'s All-In-1. It is also used to connect private E-mail systems with public E-mail systems, particularly in the U.S. The report said that, by the late 1990s, X.400 will be used

as a transmission medium for electronic data interchange applications.

EDI is expected to overtake messaging traffic in France by 1990, but not before the end of the 1990s in other countries. That means the X.400-based EDI for Administration, Commerce and Transport (EDIFACT) standard for document formatting will eventually achieve worldwide acceptance, the report said.

Companies that showed EDIFACT running on X.400 at Hannover Fair CeBIT '89 — the recent Hannover, West Germany, computer trade show — include U.S.-based IBM, DEC, NCR Corp. and Prime Computer, Inc.; Switzerland's Zellweger Telecommunication; West Germany's Siemens AG and Geonet Mailbox Systems; and the UK's SD-Scicon and Sydney Communications Ltd.

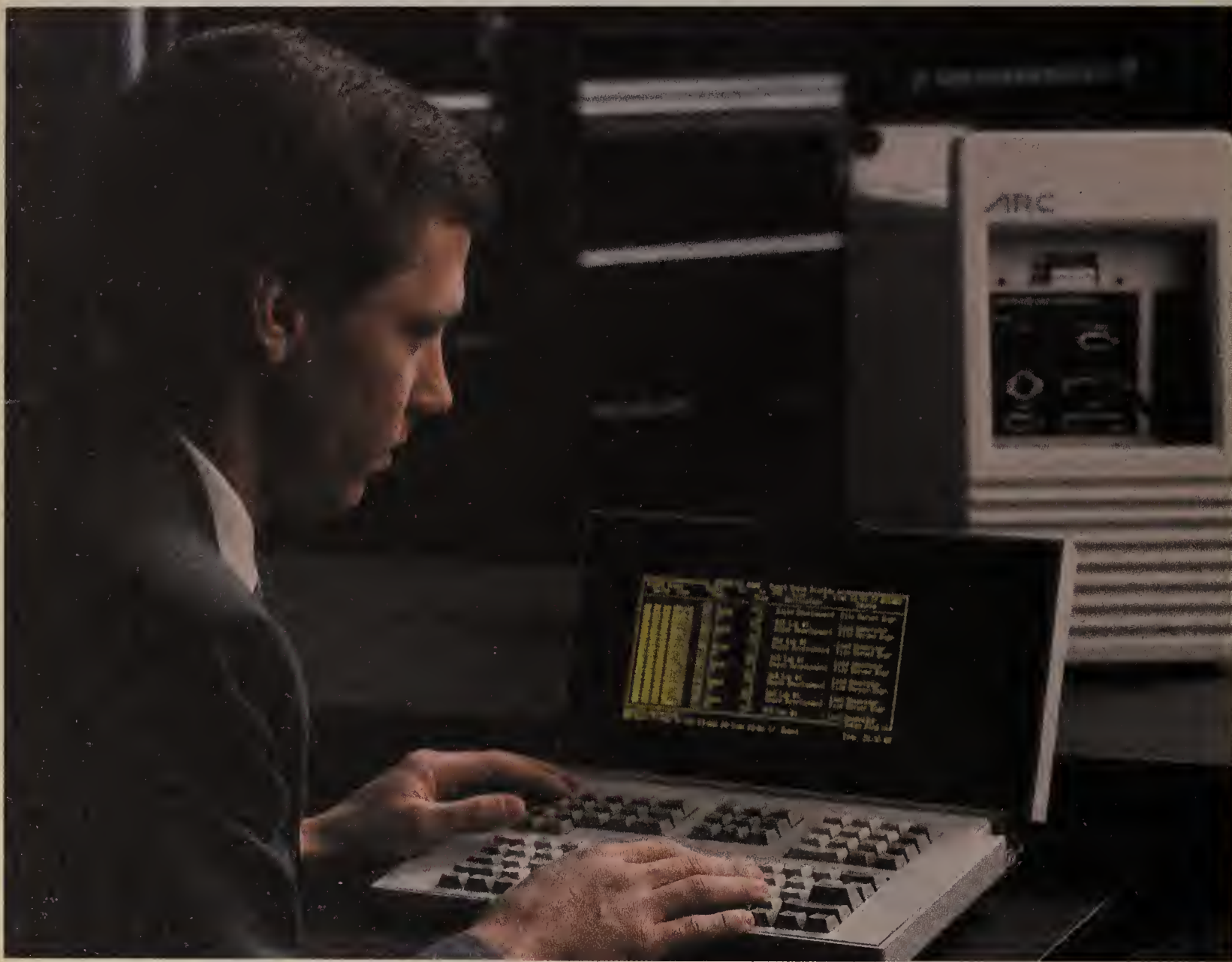
Major international concerns planning to use X.400 for EDI rather than messaging include the Society for Worldwide Interbank Financial Telecommunications for banks; Cefic, the European network for chemical companies; and Docimel, the European network for railway operators.

In France, X.400 has already emerged as the top transmission protocol for EDI. State-owned France Telecom unit Transpac, with its Atlas 400 E-mail service, has played a central role in developing the local market for EDI over X.400, Ovum said.

Three new private services — Edoni, which links distributors and manufacturers; Gencod, which links retailers with a retail trade organization; and Telermes, which links organizations involved in commercial shipping — are currently developing X.400-based offerings.

Where EDI is already established in the U.S. and UK, X.400 faces an uphill struggle for acceptance in the face of established protocols, according to Ovum.

The future of X.400 depends on how successfully it will compete with other in-



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“If X.400 is successful, there will be little need to justify connection into the X.400 community in 10 years' time.”

▲▲▲

terconnecting solutions. Barriers to using X.400, according to Ovum's study, are competition from proprietary solutions to interconnect different messaging systems and the emergence of the facsimile as the lowest common denominator of E-mail.

Ovum, however, does not see these barriers as a threat to X.400's acceptance. It argues that major organizations that have installed private E-mail systems want to maximize their benefit by linking them with other systems and services using X.400. Users also want to connect to more than one service without having to maintain more than one interface. □

Sun, Cray cooperate in development effort

continued from page 19

Simultaneous windows will dramatically reduce turnaround time for those users, Stitt said. Turnaround is the time required to download a program from the Cray to a Sun workstation, conduct edits, upload it back to the Cray, compile and run the program, then download it again to the Sun to check for errors. Programmers “can do turnarounds in matters of minutes and seconds rather than, perhaps, minutes and hours,” Stitt said.

Over the same physical channel, FEI-3 can support applications that are outside the realm of TCP/IP, including Sun's Network File System and high-speed graphics applications, he said. “Rather than getting a printout or maybe seeing an image every few minutes, users can see changing images on the screen and interact with that data,” Stitt said.

The FEI-3 gateway boards are available from Cray for \$8,000. Software drivers for the boards are available from Sun for \$3,000. Sun workstations with enough memory to support the Cray gateway range from \$30,000 to \$120,000. □

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ISDN use hinges on applications, traffic

continued from page 19

communications. "They're all geared for voice and Centrex [line] replacement. There hasn't been a real good data-oriented tariff."

Illinois tariffs

Illinois Bell Telephone Co., the only BOC with a published ISDN Basic Rate Interface tariff, computed monthly access costs for a hypothetical ISDN customer with a single 2B+D ISDN line within the Chicago local access and transport area.

Onetime installation charges for the circuit would be \$246, and monthly service charges would be roughly \$30, according to Ron Czaplewski, director of product management for ISDN and packet-switched products at Illinois Bell.

The daytime usage rate for the D channel is 12 cents per 1,000 16-character segments transmitted. The night rate is 8 cents per 1,000 segments. There is no charge for so-called intercom data traffic, which consists of calls made through a single switch.

Each B channel can support a full 64K bit/sec pipe when used in an intercom configuration or 56K bit/sec for calls running between central offices. In either case, the usage rate is 12 cents for the first minute and 10 cents for each additional minute.

By comparison, according to Michael Posch, Illinois Bell's product manager for analog private lines, leased lines have two price components: access charges for local channels connecting customer sites at either end of a circuit to a central office and a mileage-based charge for the distance between central offices.

In some cases, such as in downtown Chicago, the mileage charge would not apply. For a point-to-point, four-wire link downtown, a typical customer's local channel charge would be just over \$18 per month, or about \$37 for the complete circuit, according to Posch. The local channel charge can vary from \$14 to \$37, depending on the mix of services and options picked by the customer.

If the same customer had another office 10 miles away in a Chicago suburb, the total monthly charge, including mileage, would jump to about \$91, again depending on the various service options.

Calculating prices

Industry observers said users will have to study a number of criteria to compare ISDN and private-line costs.

The most basic criteria covers the familiar variables of the switched-vs.-private connection.

"In today's environment, you would have to compare the usage rates over the switched network to the private-line rates," Czaplewski said. "To do that, you have to look at the volume of traffic and the distance it's going. That's the simplest approach."

"The traditional methods of weighing private-line applications vs. a switched network application are still going to hold true with ISDN," said Ameritech's Devine. "There's going to be a crossover point at which it makes sense to have a dedicated facility vs. a dial-up or measured-use service" such as ISDN.

But the calculation will have to take into account the fact that a single dial-up ISDN link provides three channels, two of which — at 64K bit/sec — provide substantially higher speeds than the maximum of 19.2K bit/sec possible with an analog leased line.

ISDN, for example, may be appropriate to support data applications that can be satisfied using short, high-speed bursts, while leased lines may be retained for on-line applications.

Net maintenance

Another cost criteria users will have to consider is network maintenance, said Northeast Consulting Resources' Johnston. Private lines require a variety of separate network devices, such as modems, all of which have to be monitored and, if necessary, attended. But ISDN service incorporates many of these monitoring tasks within the carrier-supplied line.

"Even if ISDN usage costs more, you

might save something here," Johnston said.

Of course, ISDN has its own hardware costs. Those costs are high today, according to Fred Chanowski, president of TMCA Computer Task Group, Inc., a Needham, Mass., consultancy. "Time will really be the cure for the excessive hardware costs you see now," he said.

But one analyst cautioned that ISDN Basic Rate Interface may have only limited applicability as a replacement for analog private data lines. The reason: Many dedicated lines are used in multipoint configurations and their costs are averaged over several locations.

"That's the reason why they're still entrenched," said Berge Ayvazian, vice-president of research and consulting at The Yankee Group, a Boston consulting firm.

"Most early users will have a hard time justifying a line-for-line trade-out [of private lines for ISDN] if there aren't any application benefits associated with it."

Such benefits are generally in the area of computer-integrated telephony, which blends computers and telephones in applications such as telemarketing and customer service, he said.

Other applications that could tip the balance in favor of ISDN include high-speed facsimile and interactive editing, in which two geographically separate microcomputer users can edit the same document while simultaneously carrying on a voice conversation.

"The economics [of ISDN] become part of the overall cost-justification for that application instead of just a line-for-line replacement," Ayvazian said. ■

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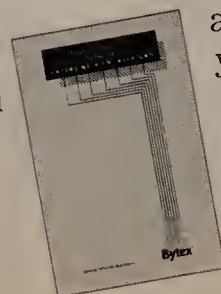
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Worth Noting

"It may be politically good to break away from the corporate LAN mold, but it's not good for interconnectivity. You're opening up a whole new can of worms."

Dave Couch
Network manager
Spartan Stores, Inc.
Grand Rapids, Mich.

Netnotes

3Com Corp. is giving away a local network diagnostics package that offers remote access to 3Com service engineers who are available for net troubleshooting.

3Com is supplying its users with Norton-Lambert Corp.'s Close-Up/Customer Terminal, a remote diagnostic software package for personal computer networks, said Steve Rizzone, vice-president of 3Com's customer service operations.

The software is free and will be sent to users that purchased 3Com's Infoline, Express and Guardian service contracts.

New service contract users will also receive the remote on-line help capability as part of their service package, Rizzone said.

The TOPS Division of Sun Microsystems, Inc. has introduced InBox Personal Connection for DOS, an electronic mail package that enables users to exchange messages between Apple Computer, Inc. Macintosh- and DOS-based personal computers.

InBox resides on DOS-based personal computers and accesses the Macintosh server. It is TOPS' first E-mail package, said Helen Berry, TOPS' InBox product manager.

The product supports 3Com Corp.'s EtherLink II or EtherLink/MC cards and Western Digital Corp.'s EtherCard Plus line of Ethernet adapters.

InBox Personal Connection for DOS is available now and costs \$99. ■

Excelan offers Novell greater Mac presence

Novell intends to capitalize on Mac expertise of Excelan's Kinetics unit, draw users to NetWare.

By Susan Breidenbach
West Coast Bureau Chief

WALNUT CREEK, Calif. — Novell, Inc. will boost its efforts to woo Apple Computer, Inc. Macintosh users into the NetWare fold if it completes its proposed acquisition of Excelan, Inc. this June.

Discussion of the deal has focused on how Novell will benefit from Excelan's expertise in the Transmission Control Protocol/Internet Protocol network arena and whether Excelan will remain the sole provider of TCP/IP software for Microsoft Corp.'s OS/2 LAN Manager.

Now that Excelan is being acquired by Novell, some analysts question whether Microsoft will attempt to sever its ties with the TCP/IP provider because it would not want Excelan's LAN Manager license and source code to be transferred to Novell.

Seemingly lost in the din of the acquisition is how much Novell stands to gain from Excelan

subsidiary Kinetics, Inc. Analysts said Kinetics is exactly what Novell needs to draw Macintosh supporters to NetWare.

"If Novell were to rank its main reasons for buying Excelan, Kinetics' Macintosh products and expertise in the various Apple protocols would be right up there," said Brad Baldwin, an analyst for Dataquest, Inc., a research firm in San Jose, Calif.

While Novell thoroughly dominates the market for networking IBM Personal Computers, Kinetics is the leading supplier of Macintosh-to-Ethernet connectivity products. The combination of the two companies seems formidable, analysts said, especially now that Novell's NetWare For Macintosh, which will integrate Macintosh systems into NetWare nets, is available.

Ed Cooper, senior director of marketing for Novell's NetWare Products Division, said the Kinetics (continued on page 24)

LANMARKS

BY CHARLES GILBERT

WAN modem supports dispersed LAN nodes

In the course of operating a large wide-area multidrop synchronous network, the issue of supporting multiple nodes from one network drop has come up regularly.

If two nodes are within close proximity to each other, a simple modem-sharing unit will do the trick, but how do you deal with two nodes that are on opposite sides of the building?

Synchronous RS-232 lines are limited to about 50 feet, so the modem-sharing unit won't work by itself. One could purchase another drop from the leased-line provider and install another modem to support the second node, but that's a pretty expensive endeavor. A modem-sharing unit connected to short-haul modems can be adjusted to work, but that requires three separate types of equipment, probably from three different vendors, and the unit doesn't scale up well if more than two drops are needed.

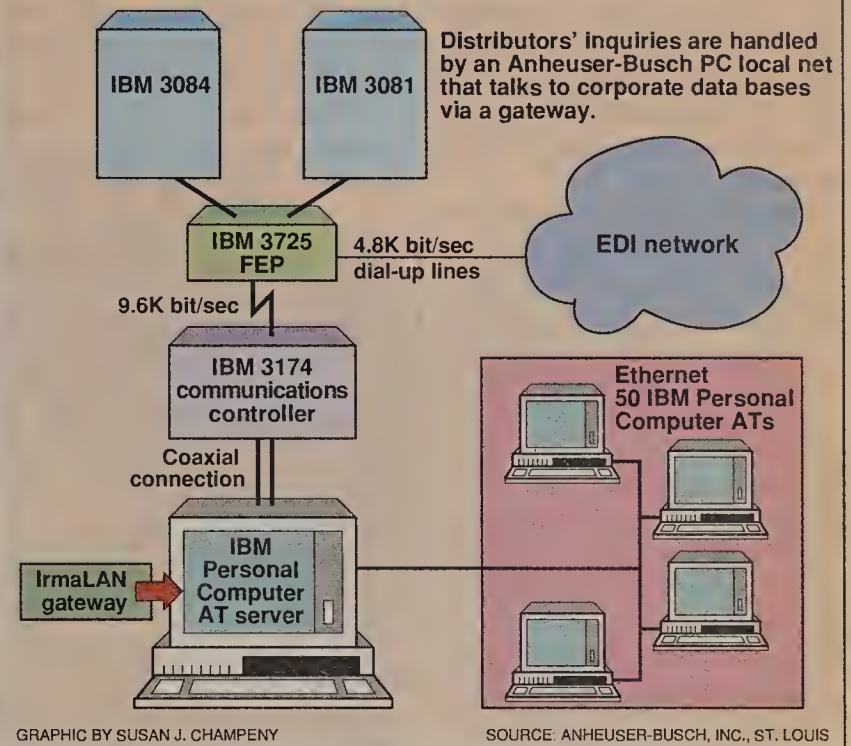
The system I employ costs less than either of these methods, is easy to install and will support as many as 15 nodes spread over a distance of four miles at 9.6K bit/sec. I use a wide-area network modem to drive a local-area network. The local net then services all of the nodes in the building.

The key piece of equipment is a multidrop short-haul modem that is designed to operate over standard in-house telephone cabling. Installation is frequently accomplished without pulling additional wires.

One modem is attached via an RS-232 connection to the leased-line modem and serves as the master unit for the local network. This master short-haul modem is connected to the rest (continued on page 24)

Gilbert is a systems programmer at Circuit City Stores, Inc. in Richmond, Va.

10Net on tap at Anheuser-Busch



Anheuser-Busch taps LAN to speed problem response

PIP net cuts overhead, time spent on queries.

By Laura DiDio
Senior Editor

ST. LOUIS — Two years after installing a local network to handle inquiries from its distributors, Anheuser-Busch, Inc. said the network has improved productivity and helped speed response to problems.

The Partners in Productivity (PIP) network links the company's IBM Personal Computer ATs, enabling operators to call up distributors' historical records as they talk to them on the phone, rather than manually weeding through files. Armed with the distributor profiles, operators can begin to track and solve problems immediately.

The PIP network has enabled the company to cut its overhead and reduce the number of personnel needed to track queries from its wholesale beer distributors, according to Richard Sleight, manager of wholesaler productivity in Anheuser-Busch's Wholesaler Productivity group.

Before the PIP network was installed in the spring of 1987, all problem tracking, such as locating lost orders and responding to requests for information, was handled manually by personnel in the Wholesaler Productivity group. "There was much greater potential to lose orders or to misplace inquiries. It usually took us longer to respond to the distributors' questions than to solve them," Sleight said.

PCs of the net

The PIP net links 50 IBM Personal Computer ATs over a 10Net Communications, Inc. 1M bit/sec twisted-pair network located at company headquarters here.

"One of the reasons we chose 10Net was because it didn't require a dedicated network server," Sleight said. Instead, the server software runs on one of the Personal Computer ATs, along with a Digital Communications Associates, Inc. IrmalAN gateway that provides access to data bases on the corporate mainframes.

With the help of the IrmalAN gateway, the PIP net links to an IBM 3081 and an IBM 3084 mainframe.

Users on the net establish IBM 3270 terminal-emulation sessions on their Personal Computer ATs.

"One of the reasons we chose 10Net was because it didn't require a dedicated server,"
Sleight said.

▲▲▲

The IrmalAN gateway carries the mainframe-bound transmission over a coaxial communications line to an IBM 3174 cluster controller, which routes it over a 9.6K bit/sec leased line to an IBM 3725 front-end processor.

Using cross-channel connectors, the front-end processor routes the transmission to the appropriate mainframe.

The PIP network handles a va- (continued on page 68)

Excelan offers Mac presence

continued from page 23

ics deal, as well as Novell's technology alliance with The TOPS Division of Sun Microsystems, Inc. to support that company's Macintosh connectivity protocols, will give Novell a penetration of the Macintosh market that is comparable to its place in IBM networks.

Steve Nelson, marketing director for Kinetics and head of advanced planning for Excelan, said the proposed merger "makes good sense" to Kinetics' customers.

"Our customers have been Apple's big customers — the ones who do high-end Macintosh networking," he said.

Novell's customers, who traditionally have been linking IBM Personal Computers, will now be able to obtain Kinetics' Macintosh network products and Excelan's wide-area TCP/IP connectivity in one package, Nelson said.

In the past, Novell has had to turn to third parties for expertise in Macintosh connectivity. When Novell decided to support the Macintosh under NetWare, it commissioned Dayna Communications, Inc. of Salt Lake City to help with product development. Kinetics will bring such expertise inside Novell.

Also, Novell should be able to leverage the Kinetics brand name to help win Macintosh users over to NetWare. Kinetics is currently the top supplier of Ethernet adapters for the Macintosh, and it also sells FastPath, a popular AppleTalk-to-Ethernet gateway.

"At the low end, we have plenty of competition, with the Ethernet board business getting more and more crowded," Nelson said. "At the high end, there is Cayman [Systems, Inc.'s] GatorBox,

which is a more expensive option [to the FastPath gateway]. But there is no one company that competes with us across the product line that we have."

Other assets Kinetics brings to the Novell merger include a Unix-based print-spooling application and tools for developing distributed Macintosh applications.

K-Spool runs on a Sun Microsystems, Inc. workstation that is attached, along with Macintoshes

and LocalTalk subnets, to an Ethernet local network.

It provides the Macintosh users with print spooling on Unix systems and gives the Unix system access to any Apple PostScript printer services on the net.

TCPort, which is part of Kinetics' LAN WorkPlace For Macintosh, is a tool for developing Macintosh applications that can be distributed across various systems on an Ethernet via TCP/IP.

"Once you have the fundamental connectivity layer taken care of with the appropriate hardware and protocol stacks, you can start working on providing more user services," he said. "We have a lot of technology that complements Novell's efforts."

Kinetics, for example, is trying to support the AppleTalk protocol on Unix systems, while Novell is developing Portable NetWare for Unix. Other user services that

both companies are looking at include electronic mail servers and gateways. Macintosh users are also likely to see a token-ring adapter from Kinetics soon, complete with NetWare drivers.

Nelson declined to confirm reports that Kinetics is close to announcing token-ring boards for the Macintosh, but he acknowledged that 1989 "is a good year to bring out Macintosh token-ring products." ■

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Modem supports dispersed nodes

continued from page 23

of the short-haul modems (slave units) in a daisy-chain configuration using two pairs of telephone wires.

Each network node requires one slave unit, so a minimum configuration uses three short-haul modems, one master and two slaves, to support two network nodes. Each slave costs about \$320, making the total cost less than the cost of one of our leased-line modems (about \$1,500). Additional drops then require only the slave short-haul modem. Therefore, the add-on cost is relatively low.

Previously, we used various modem-sharing units but experienced problems that caused response-time degradation, particularly when transmission speeds were faster than 4.8K bit/sec.

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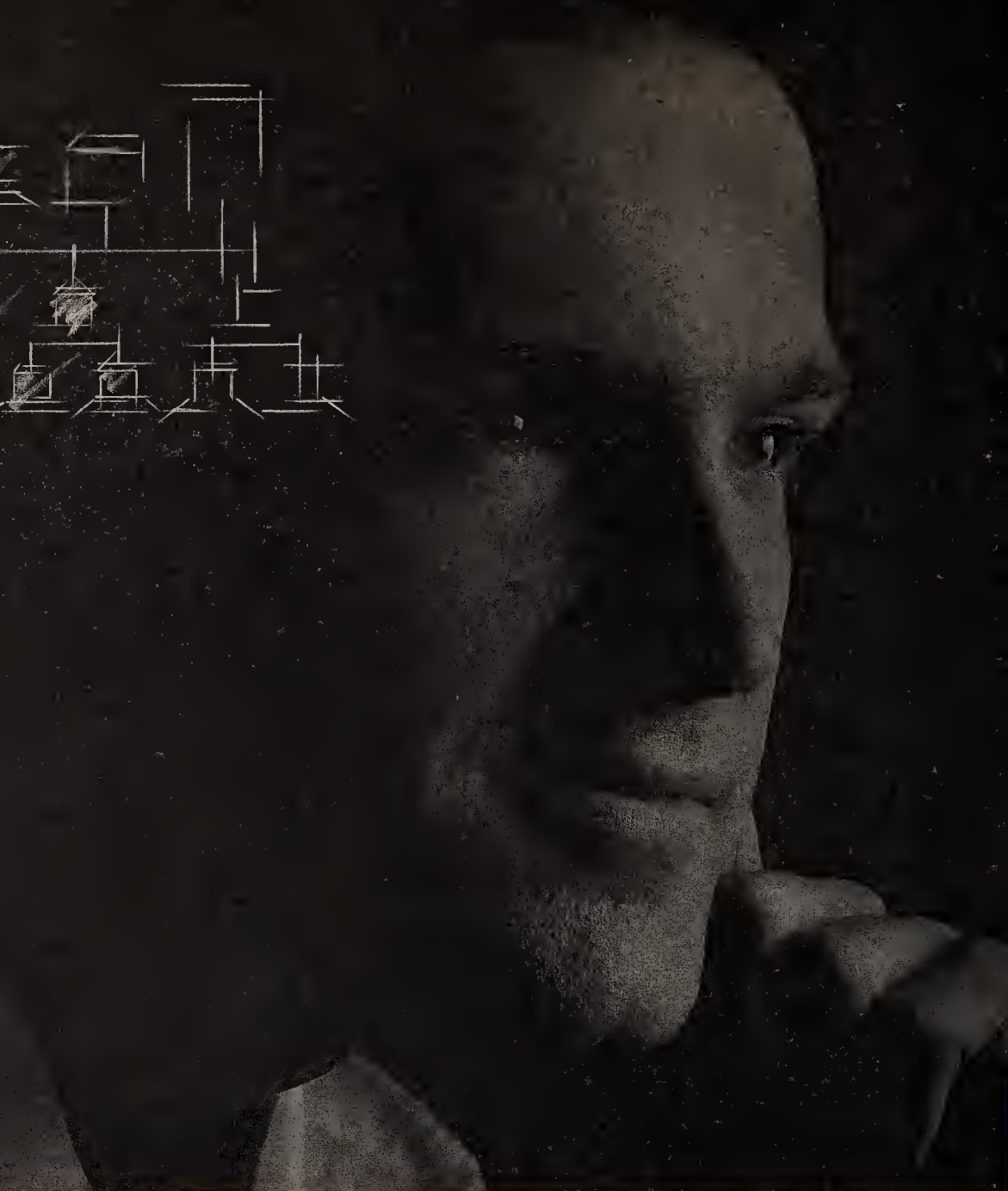
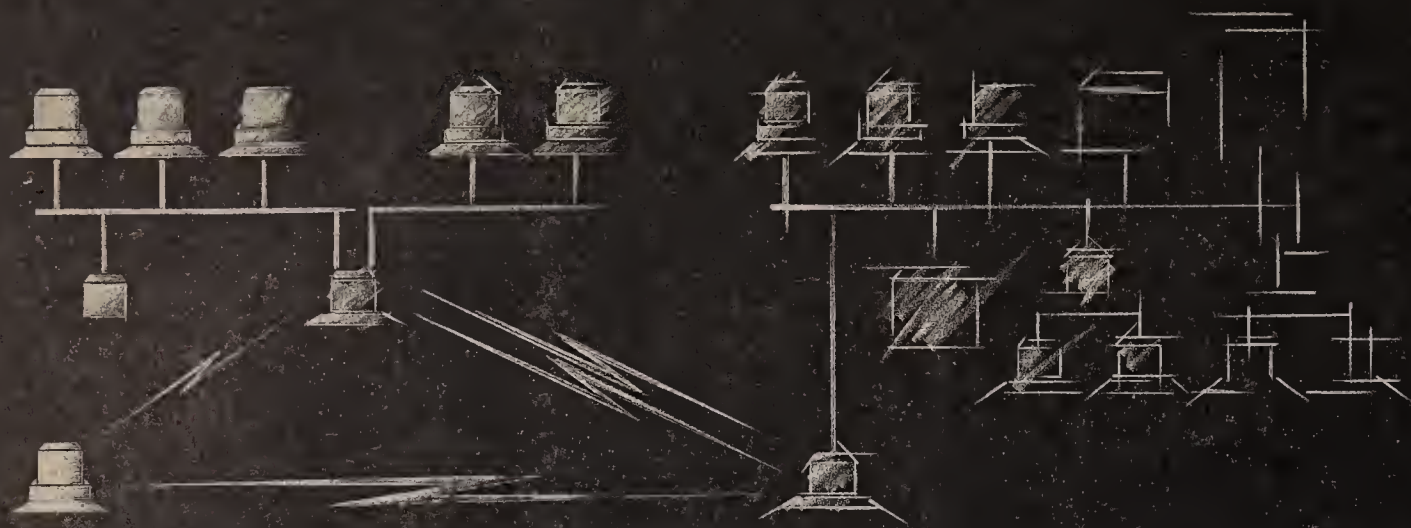
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Worth Noting

“When someone is promoted who is not ready and, as a result, fails in the job, two people screwed up: the individual who failed to prepare himself or herself for the job and the manager who made the promotion.”

Walter Ulrich
Communications consultant
Coopers & Lybrand
Houston

Association Watch

The Securities Industry Association (SIA) is sponsoring its annual Information Management Conference and Exhibit April 25 to 27 in New York.

Among several users speaking will be William Rush Jr., vice-president of Newark, N.J.-based The Prudential Insurance Co. of America, who will discuss the SIA's new private network (“N.Y. Tel awarded contract to build securities network,” *NW*, Dec. 26, 1988/Jan. 2, 1989).

Allan Kalb, vice-president of St. Louis-based A.G. Edwards & Sons, Inc., will discuss electronic market data distribution. Terence McSherry, vice-president of communications at PaineWebber, Inc. in New York, will address reducing communications costs. Alan Trager, managing director at Morgan Stanley & Co., Inc. in New York, will discuss the impact of global markets on information management.

Using artificial intelligence to increase the performance of electronic mail systems will be the subject of the next meeting of the Society for Management of Professional Computing, Inc., to be held April 21 in Boston. Speaking will be Thomas Malone, associate professor of information technology and management at Massachusetts Institute of Technology. ■

Techies need training for mgmt. roles

By Wayne Eckerson
Staff Writer

Corporations that promote technicians and engineers to management ranks must provide training to develop business and interpersonal skills or risk failure, according to net managers who have made such a move.

The transition to management can take its toll on a new manager's self-esteem and effectiveness, creating an undue amount of stress and anxiety that sometimes leads to job burnout, managers said. It can also sour the work experience of subordinates who have to labor under the manager as he learns.

“Technical managers are often promoted too high, too fast,” said William Hider, vice-president of telecommunications at the Gannett Co., Inc., a media conglomerate based in Arlington, Va. “They are promoted because they know how to deal with machines and things, not people.”

Companies that reward outstanding technicians or engineers by promoting them to man-

agement slots may not realize that they might be doing the new manager a disservice, Hider said. While a promotion generally brings network specialists a fatter paycheck and new challenges, it can also put them in an alien environment where they can be easily overwhelmed, he added.

Worlds apart

Technicians typically deal with a precise engineering world, where actions have a definite cause and effect, said Steve Archer, telecommunications supervisor at Hewlett-Packard Co. in Colorado Springs. If a company promotes a technician into management, it must equip the individual with problem-solving techniques because people are less predictable than network equipment, he said.

“Companies take technical people used to working in an action/reaction environment and move them into this funny world of personal management. And people wonder why we fail, get frustrated, have ulcers or get divorced,” Archer said.

Archer, who started as a glass lathe operator in HP's LCD manufacturing department 20 years ago, was promoted to supervisory positions on several occasions, only to be reassigned to technical staff jobs. He was eventually

(continued on page 28)

Users contemplate risk analysis tools

As concern over viruses, outages grows, users invest in software to measure risks, potential loss.

By Barton Crockett
Senior Editor

As publicity surrounding computer viruses and communications outages grows, an increasing number of users are turning to risk analysis software to evaluate the probability and potential consequences of network failures.

Relatively unheard of just five years ago, a variety of risk analysis software products have been introduced in the last few years. Today, roughly 15 packages are available, according to Steven Ross, a senior manager at New York-based accounting and consulting firm Deloitte Haskins & Sells, Co.

These products help users evaluate the effectiveness of their network and information system security by posing questions concerning security equipment and procedures. Many packages also help users estimate how much money their companies would lose if their networks and information systems were knocked out of commission.

Prices for risk analysis software range from no cost to tens of thousands of dollars. The vast majority of programs are designed for personal computers.

Although users say they need tools such as risk analysis software to automate the labor-intensive process of evaluating exposure to outages, many question the value of the information produced by these packages.

“With any [risk analysis] software, part of the evaluation is go-

An even larger issue is the dependability and quality of support offered by risk analysis software vendors. The market is dominated by small venture firms, with few support employees and a high risk of bankruptcy.

“We just spent \$15,000 on software from a company that went belly-up,” said Joseph Pujals, information security manag-

Small firms, with few support employees and a high bankruptcy risk, dominate the market.

▲▲▲

er with the state of California. “The organizations you deal with just aren't stable.”

The risk analysis software products currently available offer a range of options. Some, such as Rank-It, a \$95 personal computer package sold by Jerry Fitzgerald & Associates of Redwood City, Calif., provide a standard procedure to prioritize the importance of different information systems and networks and to assess how vulnerable they are to an outage.

Others, such as the Los Alamos Vulnerability Assessment (LAVA), evaluate the vulnerability of a data center and the network it supports to virtually every known kind of physical threat or hacker intrusion. The software, developed for government agencies in the mid-1980s by the Los Alamos National Laboratory in Los Alamos, N.M., makes its evaluations using expert system technology and exhaustive questionnaires (“Risk audit helps NASA protect net,” *NW*, Oct. 3, 1988).

LAVA runs on personal computers and is available free to government agencies. Private companies can buy the package from the National Energy Software Center in Argonne, Ill., for \$200 to \$1,200, depending on whether the firm is a member of the center, a domestically based firm or a foreign corporation.

Still others, such as the \$14,900 Bayesian Decision Support System sold by San Francisco-based Ozier, Perry & Associates, combine expert system technology with data on the prob-

(continued on page 32)

EXECUTIVE BRIEFS

BY BARTON CROCKETT

The computer crime scrapbook

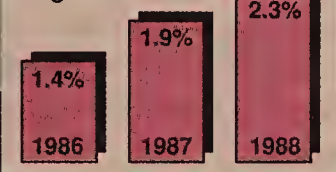
Average 1988 losses at large organizations due to computer crime:

- \$109,000
- 365 man-hours
- 26 computer hours

Approximate 1988 losses in the U.S.:

- \$555,464,000
- 930 man-years
- 15.3 computer years

Average information security budget as a percentage of an organization's total computer budget:



Figures are based on a 1988 survey of 3,500 members of the Information Systems Security Association and computer security experts.

SOURCE: NATIONAL CENTER FOR COMPUTER CRIME DATA, LOS ANGELES
GRAPHIC BY SUSAN J. CHAMPENY

To catch a thief. The average U.S. organization lost \$109,000 to computer crime last year, according to research conducted by the National Center for Computer Crime Data (NCCCD) in Los Angeles. The center estimated that computer crime cost the U.S. about \$555 billion last year.

To combat this, according to the NCCCD, users are investing larger portions of their computer budgets into information security. The average company or government agency spent 2.3% of its computer budget on information security last year, up from 1.4% in 1986. The NCCCD based these numbers on

(continued on page 32)

Prices for risk analysis software range from no cost to tens of thousands of dollars.

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ing to be subjective,” said Gerald Grindler, systems manager for computer security administration at Southwestern Bell Telephone Co. and president of the Information System Security Association in Newport Beach, Calif. “Given this, I guess I’d rather do it myself than pay thousands of dollars for software that produces figures senior management will pick apart anyway.”

Techies need training for mgmt.

continued from page 27

named telecommunications supervisor, a post he has held for the past 10 years.

"I'm a good technician, but it took an awful lot to learn how to be a good manager," Archer said.

Training is key

The incongruities between management and technical posi-

tions should not keep companies from promoting technical people into management, network managers said. Sensible training programs that prepare candidates before they are promoted can improve the performance of a work force, rather than demoralizing it, they said.

Hider believes companies

should gradually move technical specialists into management positions, not thrust them into a sink-or-swim situation. Promising network specialists should be given the opportunity to head small projects, where they can demonstrate whether or not they have management potential.

If they show leadership potential, they should be sent to management training seminars and leadership schools to polish the

skills they will need to be successful managers.

Archer gained much of his management know-how from on-the-job experience, but he also benefited from HP's Process of Management seminars, which present techniques and strategies of successful HP managers.

He said his first months as a manager would have been much easier if the company's management had sent him for training

prior to promoting him.

Budget, what budget?

Unfortunately, many companies, especially small ones with limited resources and staff, do not have the time or money to properly prepare personnel for their new job responsibilities, Hider said.

When Larry Acee was promoted to manager of telecommunications at Datek/Instacard Corp., a small bank in Buffalo, N.Y., he had little previous management experience. Shortly after beginning the job, Acee said his boss told him that the department's budget was due on his desk in three days.

"I had never even seen a budget before, let alone filled one out," said Acee, who started at Datek/Instacard as a network operator.

Besides budgets, new manag-

"I had never even seen a budget before, let alone filled one out," Acee said.

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ers must master a host of other business skills, including how to schedule projects, perform cost analyses of major purchases and plan long-term network operations improvements.

New interpersonal skills include how to conduct meetings, deal with problem employees, perform staff evaluations, negotiate with vendors and maintain positive staff morale.

"As a technician, you become skilled at the short-term work of putting out fires and maintaining a certain level of network uptime every day. But as a manager, you are thrust into a position where you need to think long-term about reducing costs and improving network efficiency. It's two different worlds," Acee said.

Need to delegate

Walter Ulrich, a communications consultant at Coopers & Lybrand in Houston, said many outstanding technicians who get promoted to management positions often fail to delegate responsibility because they are unwilling to relinquish the satisfaction and rewards they receive from being an expert at solving technical problems.

"Managers who were recently technicians or engineers often will assume responsibility for a technical problem instead of teaching their subordinates how to solve it. Managers have difficulty recognizing that their expertise as managers involves acting as a coach, not a player, and pulling together the resources the staff needs to do their jobs effectively," Ulrich said. ▀



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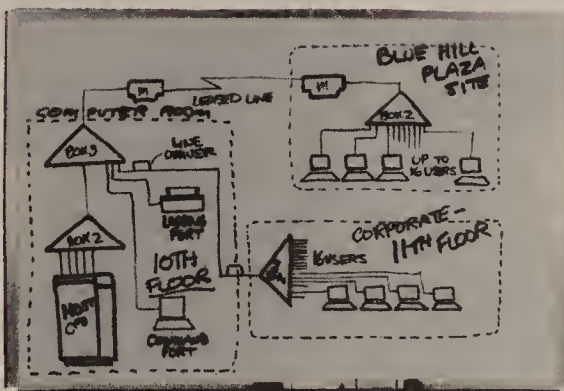
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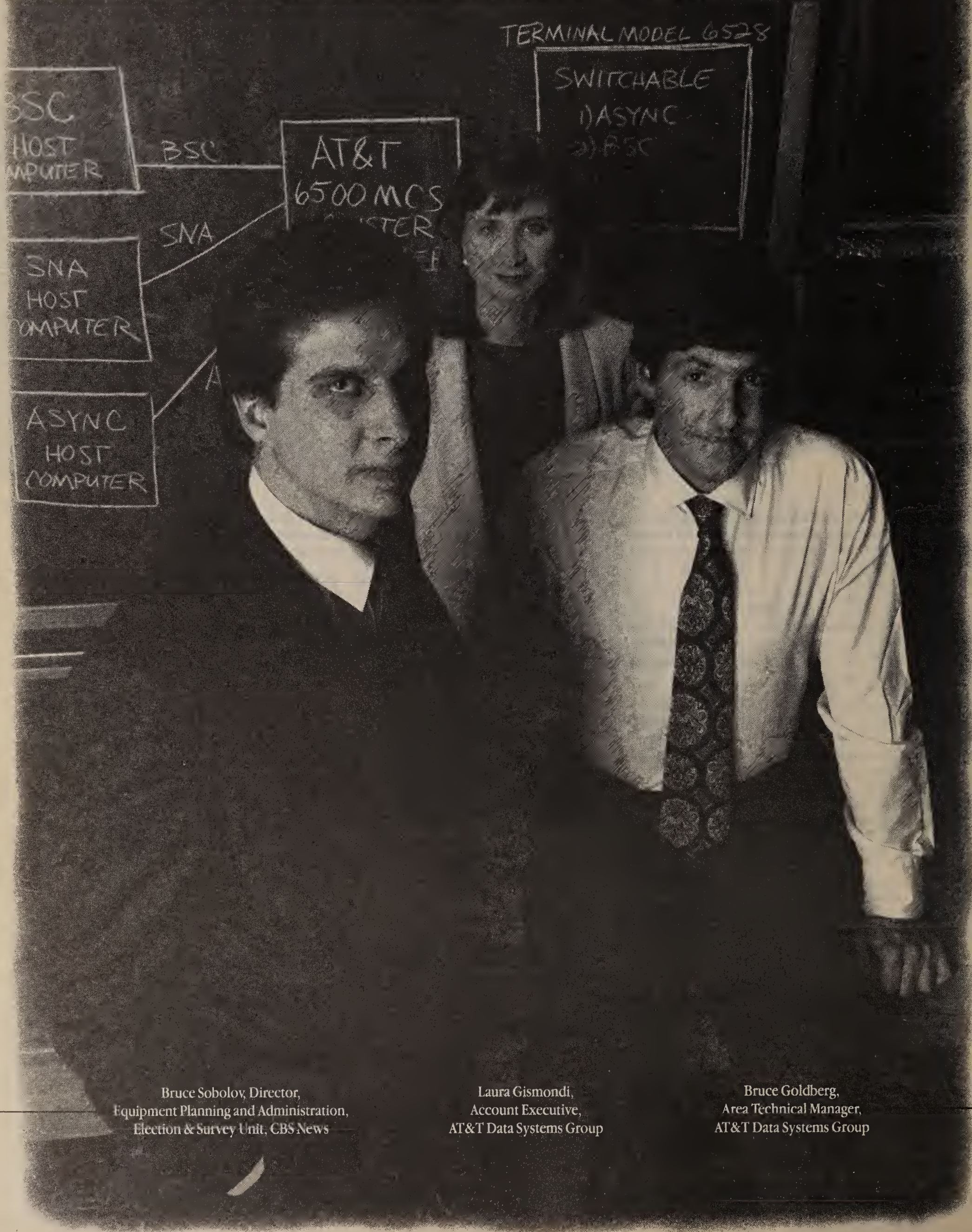


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Bruce Sobolov, Director,
Equipment Planning and Administration,
Election & Survey Unit, CBS News

Laura Gismondi,
Account Executive,
AT&T Data Systems Group

Bruce Goldberg,
Area Technical Manager,
AT&T Data Systems Group



Bruce Sobolov of CBS News, Laura Gismondi and Bruce Goldberg, AT&T, savor the afterglow of their own post-election victory. They take us behind the scenes for a glimpse at some of the reasons why CBS was successful on election night.

FEBRUARY 15, 1989

AT&T: Afterwards, the critics said CBS was the best, the fastest.

CBS: Right, but we sweated it out for more than a year. With more 20-hour days than I care to remember.

AT&T: Your situation was pretty complicated.

CBS: We were faced with election projections, exit-poll analysis, and other studio programming applications running on IBM hosts.

AT&T: Plus the NewStar system we tied in with our wide-area network, ISN. It's distributed networked computing. Hey, we thrive on this stuff.

CBS: We're impatient around here. Speed is the only way you succeed with election coverage. The first thing we did was provide multi-host access with the 6500 System. Last election, everybody who needed access to two systems used two terminals. Twice the space, twice the cable, additional controllers, added expense, and wasted time.

We had programmers working simultaneously on three host applications, two bisync, one SDLC. They were constantly skating between terminals, wearing ruts in the rug. Now they have access to multiple sessions simultaneously from one terminal.

AT&T: The data moves over twisted pair, the same type wiring the technicians pulled for your System 75 PBX. That made sense.

CBS: An added advantage was having the same dedicated AT&T technicians installing and maintaining our system, providing consistency to my operation.

AT&T: But really, Bruce, why us?

CBS: Your responsiveness. At

custom host software we always used. We greatly reduced our cost.

AT&T: The other networks are watching, thinking, "How come CBS has the results already and we don't?"

CBS: It was a good night for us. Now the name of the game is streamlining for 1990. We're talking about a networked computer solution as a gateway into different host systems.

AT&T: With the AT&T Systems already up, running, and in place, we can almost completely automate your survey system.

CBS: That's a real big plus for all of us.

AT&T: Something tells me I've seen that same glint in your eye before. (Laughter)

Skating between terminals put ruts in the rug.

CBS, we all agreed that what we needed was someone who could deliver it fast, install it, test it, and support it. And you were hungry. You never said, "No, we can't do it." And you never took long to say "yes."

AT&T: You had computer networking problems. Solving them is the house specialty.

CBS: We do distributed computing to the nth degree. Our reporters are all over the country. They call in their results when the precinct closes. Before, we had over a hundred operators standing by, with phones and terminals. That election night we introduced the voice response system running on AT&T PCs.

AT&T: How many calls?

CBS: Thirty, thirty-two calls at once, reporters everywhere having voice response conversations with the IBM host. And all done with the same

The CBS Solution:

THE CHALLENGE:

Integrate IBM and DEC host computers and NewStar editorial system. Build an advanced computerized voice response system to speed election-night projections.

THE SOLUTION:

AT&T 6500 Multifunction Communication System with multi-host sync/async 6529 terminals. AT&T CONVERSANT® Voice System for advanced communications running on AT&T WGS computers. AT&T System 75 PBX. AT&T Information Systems Network (ISN), a wide-area network.

THE RESULT:

CBS News provided fast, accurate election coverage throughout Campaign '88. The *Baltimore Sun* reported that, "CBS was recording results in all sorts of key races faster and with far more authority than either of the other networks."

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Users contemplate risk analysis tools

continued from page 27

ability of various natural disasters and technical glitches. The system evaluates where a network or information system is most vulnerable and what kind of protection devices would be most cost-effective.

Some of the less expensive packages, users said, can help network managers with little knowledge of standard risk analysis techniques to more clearly evaluate their security measures. Some of the advanced packages, proponents argue, can save users a good deal of time and money.

"I know of one consulting agency that took six months and charged a user a quarter of a million dollars to do a risk analysis," said Suzanne Smith, who led the ef-

fort to create LAVA for Los Alamos. "LAVA can achieve the same thing in a week."

Several users said that simply having risk analysis software on hand will let them perform evaluations of network vulnerability more often by making the process easier and less expensive. This will improve network protection by letting users more quickly identify when changes in a network pose a security risk.

"Our agencies are required by law to do risk analyses, but some are more conscientious about it than others," the state of California's Pujals said.

"Automated packages would make it easier for agencies to do risk analyses more often. This, in turn, would help them more quickly find security threats, which tend to creep up without you knowing," Pujals said. ■

A sample of risk analysis software packages

- **Supplier:** Jerry Fitzgerald & Associates, Redwood City, Calif.
 - **Product Name:** Rank-It
 - **Description:** Personal computer-based software that outlines a standard procedure for assessing vulnerability.
 - **Cost:** \$95 (single-site license)
-
- **Supplier:** Los Alamos National Laboratory, Los Alamos, N.M.
- **Product Name:** Los Alamos Vulnerability Assessment (LAVA)
- **Description:** Personal computer-based expert system.
- **Cost:** Free to government users; \$200 to \$1,200 for private companies (available from the National Energy Software Center in Argonne, Ill.)
-
- **Supplier:** Ozier, Perry & Associates, San Francisco
- **Product Name:** Bayesian Decision Support System
- **Description:** Personal computer-based expert system with data on the probability of various natural disasters and technical glitches.
- **Cost:** \$14,900 (single-site license)
-
- **Supplier:** International Security Technology, Inc., New York
- **Product Name:** Risk Analysis and Management Program (RAMP)
- **Description:** Mainframe-based package that outlines standard procedures for evaluating risk of information system outages and calculates probable losses.
- **Cost:** \$16,500 (single-site license)

Executive Briefs

continued from page 27

1988 surveys of 3,500 Information System Security Association (ISSA) members and security experts.

However, these increased security expenditures may be spent on the wrong kind of protection, leading users to invest more in information security without making their systems any more secure, according to Gerald Grindler, president of ISSA, which is based in Newport Beach, Calif., and systems manager for computer security administration at Southwestern Bell Telephone Co.

"There's been far too much emphasis on what I term 'network security,' and not enough on 'system security,'" he said.

By network security, Grindler said he means devices that restrict access at the periphery of a network.

These devices, which include callback modems, locks for disk drives and tokens that users insert into terminals for network access, are designed to weed out unauthorized users from a network before they try to log on.

Grindler said such devices are far more expensive and offer no greater benefits than security products residing in the operating system of a computer, which restrict network access by doing such things as checking passwords.

"With all the publicity about viruses, senior management is having us technical types go out and buy the fancy network security devices before we even get the more basic system security products fully in place," he said.

CIMply unimpressed. Large British manufacturers are making increasing investments in computer-integrated manufacturing (CIM), yet for many, these expenditures are not paying off as they expected.

So concluded the London-based consulting firm A.T. Kearney, Ltd. in a new report called "Computer Integrated Manufacturing: Competitive Advantage or Technological Dead End?"

The report, which is based on responses from top executives at 216 manufacturing firms in the UK, stated that the average British manufacturer, with sales of about \$170 million annually, has spent more than \$6.25 million over the past five years on CIM. In the next five years, these expenditures should grow by 30%. To date, the payoff from this CIM investment has fallen below management expectations, the report said. This is in part because "CIM has been introduced from the bottom up as a technical solution." ■

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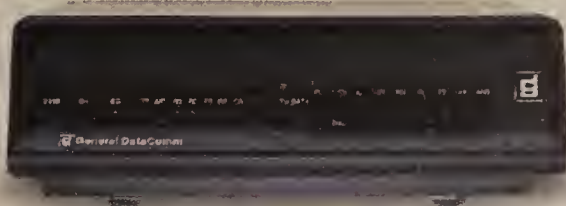
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- CASE/Datatel's private-line modem that operates at 19.2K bit/sec
- A stand-alone Ethernet adapter that links Apple Macs to an Ethernet
- Short-haul modems from Datacom Tech that extend parallel peripheral-to-host links

First Look

GE Info Services creates UPC catalog

GE Information Services recently announced a service that lets retailers access an electronic catalog that lists the Universal Product Code (UPC) numbers of multiple manufacturers.

UPC*Express is integrated with GE Information Services' electronic data interchange service, EDI*Express System. With UPC*Express, GE Information Services collects and stores UPCs from product manufacturers. Retailers can then dial into the GE Information Services network to search for and download the UPCs of the products they stock.

Manufacturers update their UPC catalogs by sending changes to GE Information Services via EDI*Express or magnetic tape. GE Information Services processes and validates the new information, updates that manufacturer's catalog and automatically distributes updates to retailers.

Retailers receive UPC data in the Uniform Code Council's General Merchandise and Apparel Implementation Committee standard format or the Voluntary Interindustry Communications Standards committee's 832 document standard format.

Without an electronic UPC catalog, retailers must wade through volumes of UPCs received from hundreds of vendors to find the codes of the products they stock. Retailers use UPCs on price tags to keep

(continued on page 36)

Devices let LECs handle voice/data

BRIDGEWATER, N.J. — Integrated Network Corp. (INC) recently introduced two products that will enable local exchange carriers to offer services supporting simultaneous voice and 19.2K bit/sec data transmissions over a dial-up link.

The product line comprises Per-line Channel Units, which are installed in central office sites, and 192DVM multiplexers, which are installed at the customer's premises. Together, the products let users access central office-based switched voice services and either switched or dedicated data services.

Regional Bell holding companies Nynex Corp. and Ameritech have already agreed to install the Per-line Channel Units. In addition, they have released specifications that will enable other

vendors to build customer premises equipment that takes advantage of the technology.

The 192DVM transmits voice within the 4-kHz band of a standard dial-up connection. Using an INC proprietary encoding technique similar to alternate mark inversion, the device transmits data in digital form at higher frequencies.

Per-line Channel Units at central offices located up to 18,000 feet from the multiplexer separate the transmission. The units then route voice to the circuit switch and data to dial-up circuits, digital data services or other central office-based data communications equipment.

The 192DVM costs between \$300 and \$400, depending on which central office data service users plan to access. Users will also have to acquire a specially tariffed circuit from the local carrier. An INC spokesman said Nynex is currently developing a tariff for its operating areas.

Users can reach INC by writing to 757 Route 202/206, Bridgewater, N.J. 08807, or by calling (201) 218-1600. □

PC program development supports range of hosts

By Jim Brown
New Products Editor

BURLINGAME, Calif. — Aspen Research, Inc. recently enhanced its application development software to support communications between microcomputer applications and programs on IBM System/3Xs, Application System/400s and mainframes.

The new Mozart software replaces the company's earlier Enter/3270 product, which made it possible to develop programs

building application-to-application links by not requiring changes to host applications.

With Mozart, users can develop IBM Personal Computer-based applications that receive IBM 3270 or 5250 data streams from host applications and display them on a customized Personal Computer screen. Alternatively, Mozart lets users develop Personal Computer applications capable of retrieving data from multiple hosts and display that data on one Personal Computer screen.

Mozart also makes it possible to develop applications that enable Personal Computers to access Ashton-Tate Corp.'s dBase III data base management system while concurrently running a terminal-emulation session.

Mozart is similar to Microsoft Corp.'s Windows and IBM's OS/2 Presentation Manager, but the company said Mozart applications require fewer lines of code than either product. Mozart works with Digital Communications Associates, Inc. Irma terminal-emulation boards and terminal-emulation software.

Mozart costs \$500 per copy and runs on a Personal Computer with at least 250K bytes of random-access memory.

Users can contact Aspen Research by writing to 1350 Bayshore Highway, Suite 630, Burlingame, Calif. 94010, or calling (415) 340-1588. □

Mozart works with DCA's Irma terminal-emulation boards and software.

▲▲▲

that supported application-to-application links between microcomputers and mainframes.

The software operates at the presentation layer of the Open Systems Interconnection model. Applications developed with Mozart use existing terminal-emulation software and adapter boards to establish microcomputer-to-host links. Mozart includes a fourth-generation development language that eases the task of

LeeMah single-port security product out

Entry-level device can be used in callback mode or with an electronic key called InfoKey.

By Jim Brown
New Products Editor

HAYWARD, Calif. — LeeMah DataCom Security Corp. recently unveiled a security device that protects access to a single host port from a dial-up line.

The TraqNet 2001, which operates with modems of any speed and any protocol, can function as a callback security device or can work in conjunction with a LeeMah InfoKey authentication device to eliminate the need for recalling.

In the callback mode, users dialing into a host are prompted to enter an access code and hang up. TraqNet 2001 validates the code by searching a list of as many as 256 user access codes and phone numbers before calling the user back at the authorized number.

TraqNet 2001 uses a LeeMah-developed loop current detection technique to ensure a phone line has been disconnected at the central office before it dials back the remote location. With this technique, TraqNet 2001 waits until it detects a tone transmitted by the central office when the remote user hangs up before it dials the user back.

Without this technique, a hacker with a user's access code can dial into the host site and remain on the line after the callback device hangs up. Because dial-up connections remain active at the central office several seconds after one party hangs up, the hacker is still on the line when the callback device attempts to redial the user.

Besides callback security, TraqNet 2001 can be used with LeeMah's InfoKey, a portable, battery-powered authentication device. InfoKey is attached via RJ-11 or RJ-45 to a remote modem and, when the user dials into the host, transmits a serial number and the user's personal identification number (PIN).

After validating the serial number and PIN, TraqNet 2001 uses the Data Encryption Standard (DES) algorithm to create an encrypted message called a challenge that is then transmitted back to InfoKey. To meet the challenge, InfoKey uses the DES algorithm to decrypt the message and prepare a response. That response is also encrypted using DES before it is transmitted.

If InfoKey's response is legitimate, TraqNet 2001 establishes a connection with the host. Because it eliminates the need to

call back remote users, InfoKey can be used by customers such as traveling salespeople, who dial into a host from many locations, or in applications that require the caller to pay for the call, such as a bulletin board subscriber.

TraqNet 2001 also has a built-in interface that enables a TraqNet 2001 to validate a dial-in call from another TraqNet 2001. This

Besides callback security, TraqNet 2001 can be used with LeeMah's InfoKey.

▲▲▲

enables users to establish dial-up connections between hosts.

In addition to supporting user validation, TraqNet 2001 maintains an audit trail of all host port access attempts in random-access memory, which users can access using a locally attached ASCII terminal. Alternatively, a net of as many as 100 TraqNet 2001s can be configured and controlled from a central-site IBM Personal Computer running LeeMah's NetStat net management system.

NetStat includes a communications controller with either eight or 16 RS-232 ports and can be used to link to central-site TraqNet 2001s or to modems capable of establishing dial-up links to remote TraqNet 2001s. Customers can use NetStat to upload TraqNet 2001 audit trail information to the central-site Personal Computer at user-specified times.

NetStat also includes LeeMah's TraqStat II software, which enables users to create customized reports using audit trail information. NetStat's Directory Editor and Upload/Download software enable central-site administrators to change the user access codes and telephone numbers stored in remote TraqNet controllers.

TraqNet 2001 costs \$845. InfoKey costs \$150. A 16-port NetStat system costs \$6,500, and an eight-port version sells for \$4,500.

Users can reach LeeMah in writing at 3948 Trust Way, Hayward, Calif. 94545, or by phone at (415) 786-0790. □

Western Digital token-ring LAN interfaces debut

By Susan Breidenbach
West Coast Bureau Chief

IRVINE, Calif. — Western Digital Corp. recently entered the token-ring market with two aggressively priced local network interfaces that include built-in support for unshielded twisted-pair wire.

The new TokenCard and TokenCard WS boards, which cost \$599 and \$499, respectively, support the IEEE 802.2 Logical Link Control standard and incorporate a Data Link Control interface that ensures interoperability with IBM's 4M bit/sec Token-Ring boards.

"The day we entered the Ethernet market in 1987, prices of Ethernet boards dropped \$200, and we are now the No. 2 supplier of them [after 3Com Corp.]," said Bill Johnson, a marketing director for Western Digital's Communications Division. "We hope to see something similar happen in the token-ring market."

There are some signs that a major pricing adjustment is taking place in the token-ring market, aided in part by the availability of a new token-ring chipset from Texas Instruments, Inc. The chipset is packaged in low-cost plastic rather than ceramic, offering manufacturers of token-ring products an opportunity to save money on board components.

The Western Digital announcement came two weeks after Racore Computer Products, Inc. announced significant price reductions on its 4M bit/sec token-ring adapters (its eight-bit board now costs \$399). Late last fall, NCR Corp. reduced the price of its low-end token-ring board to \$395.

According to market studies, IBM's share of the token-ring pie has hovered consistently in the 90% range, leaving the rest of the vendors to battle for portions of the remaining slice.

Although some vendors are trying to out-perform and out-feature IBM's adapters, Western Digital and Racore are trying to attack a more vulnerable spot: the high price of IBM's interfaces, which are in the \$750 to \$895 range.

Western Digital is also hoping the pricing will encourage Novell, Inc. NetWare users with old, nonstandard local network hardware to upgrade to the token-ring platform, he added.

Each of the new Western Digital boards has both a DB-9 connector for attaching to IBM Type 1 or Type 2 cable and an RJ-11 connector that supports unshielded twisted-pair (IBM Type 3) wire.

The inclusion of an RJ-11 adapter is a rather unique feature; most token-ring manufacturers accommodate unshielded twisted-pair cable via a DB-9-to-RJ-11 adapter that plugs into the back of their boards.

The TokenCard, designed for file servers, has 128K bytes of memory for data buffering. According to Johnson, the board has been optimized to take advantage of the caching and other performance-enhancing features of NetWare.

The TokenCard WS, intended for workstations, has 2.8K bytes of buffer memory. A read-only memory socket is provided for the boot ROMs needed by diskless workstations. Both boards come with software support for NetWare, IBM 3270 terminal

emulation, and IBM's PC LAN Program, LAN Support Program and Advanced Program-to-Program Communications/Personal Computer. They are both eight-bit boards. According to Johnson, 16-bit and Micro Channel versions will follow later this year.

Western Digital also introduced a multistation access unit (MAU) that lets workstations use unshielded twisted-pair cable to link to a token-ring network.

Priced at \$399, the TokenHub has four RJ-11 jack connectors, and as many as 72 users can be supported by daisy-chaining the MAUs together. The TokenCard, TokenCard WS and TokenHub are shipping now.

For more information, contact Western Digital at 2445 McCabe Way, Irvine, Calif. 92714, or call (714) 863-0102. ■

First Look

continued from page 35

better track of sales and inventory. This enables them to reorder only the items that have been sold.

New subscribers to the UPC*Express Catalog must pay a onetime service initiation fee of \$300. The monthly subscription fee is \$300. Retailers pay an additional \$30 for access to each manufacturer's UPC catalog, and manufacturers pay a \$30 fee for each retailer that receives their automatic UPC updates. GE Information Services also charges \$80 for each magnetic tape it processes for manufacturers or retailers.

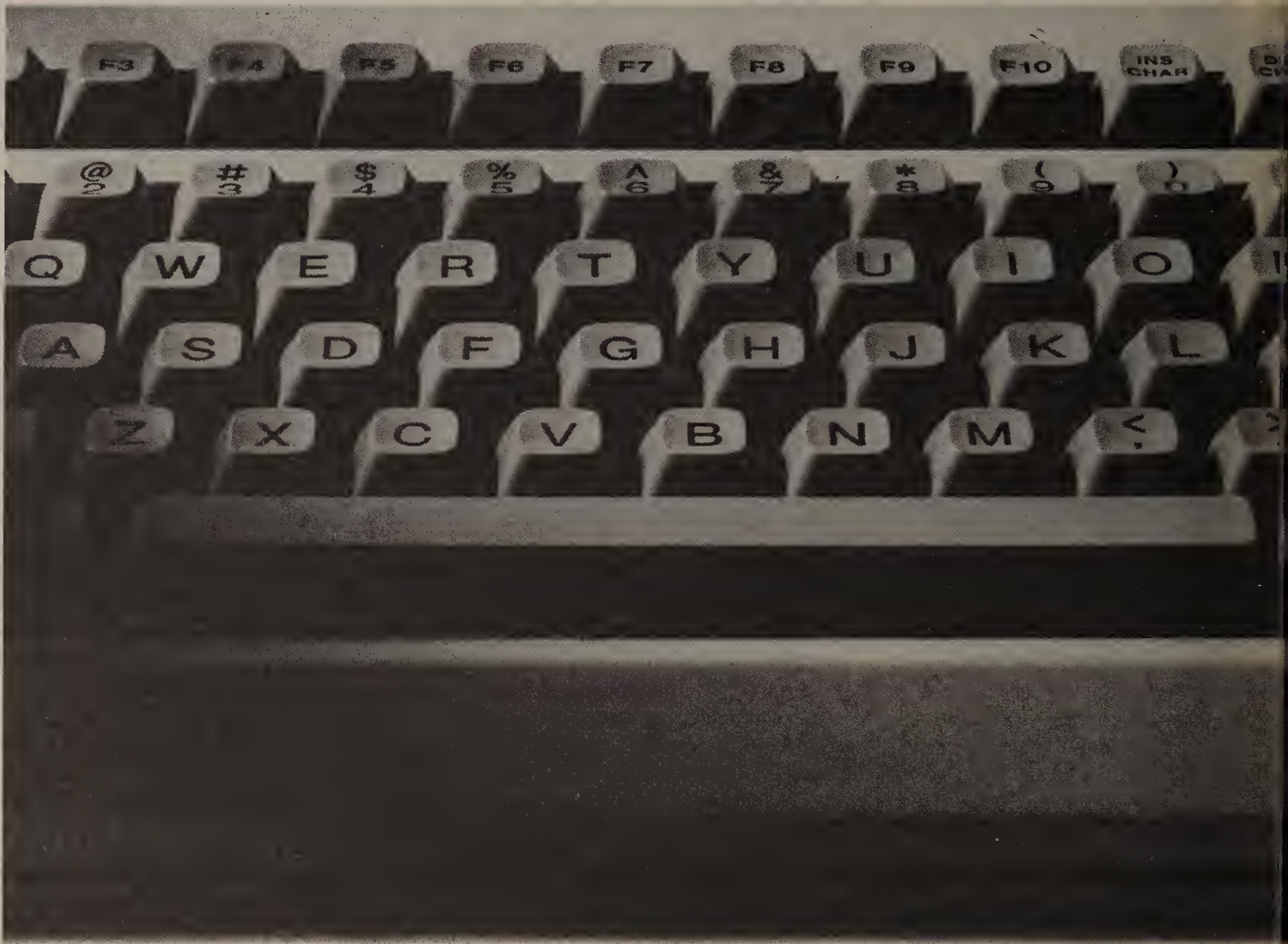
GE Information Services, 401 N. Washington St., Rockville, Md. 20850, or call (301) 340-4000.

Leased-line modem operates at 19.2K bit/sec

CASE/Datatel, Inc. recently announced a private-line modem that operates at 19.2K bit/sec.

Called the DCM1900, the modem supports full-duplex transmission of synchronous data over four-wire, point-to-point private lines. The DCM1900 automatically adjusts the speed at which the modem transmits data, depending on the quality of the circuit being used. For example, as line quality degrades, the modem shifts to lower speeds such as 16.8K bit/sec, 14.4K bit/sec, 12K bit/sec, 9.6K bit/sec and 4.8K bit/sec.

The modem uses a trellis-coded modulation scheme at speeds above 4.8K bit/sec. Trellis coding reduces the signal-to-



Pacific Bell Introduces Advanced Of An Automatic Transmission Is

In 1939, an Oldsmobile rolled out of the factory with an interesting new feature: a device that instantly changed gears to meet the needs of the driver. That device was called an automatic transmission. And the automobile was never the same.

In 1989, Pacific Bell is offering its customers a new kind of data transport service. It's called the

Advanced Digital Network; a data transport service that can instantly change speeds to meet the needs of your business. And digital networks will never be the same.

The Advanced Digital Network was developed by Pacific Bell to combine the best features of our existing digital transport services—features like exceptional reliability and trans-

mission quality—with the affordability and flexibility of analog systems.

But the most important new benefit of the Advanced Digital Network is control.

Advanced Digital Network gives every business maximum control of its network. Not only have we added useful new transmission speeds such as 19.2 and 64kbps, but

A PACIFIC TELESIS COMPANY / ■■■■■■

© 1989 Pacific Bell

noise ratio on the transmission line. In addition, the modem has both local and remote loopback tests for analog and digital lines.

The stand-alone DCM1900 is small enough so that two of the units can fit side-by-side on a 19-in. rack modem shelf.

Available now, the modem costs \$1,995.

CASE/Datatel, Inc., 55 Carnegie Plaza, Cherry Hill, N.J. 08003, or call (800) 424-4451.

Stand-alone unit links Apple Macintoshes to Ethernets

Compatible Systems Corp. recently introduced a stand-alone Ethernet adapter that connects Apple Computer, Inc. Macin-

tosh microcomputers to an Ethernet local network.

Ether+ is an external unit capable of supporting both standard and thin Ethernet wire. The device supports a small computer systems interface (SCSI) port that is used to provide a connection to the SCSI port of a Macintosh. Ether+ can be one of many peripherals daisy-chained to the Macintosh's SCSI port.

Ether+ is sold with driver software that conforms to Apple's network link access specifications and allows the Macintosh to be linked to Ethernets running Apple's AppleShare, the TOPS division of Sun Microsystems, Inc.'s TOPS and Novell, Inc.'s NetWare network operating systems.

The company said Ether+ allows Macintosh users to take advantage of Ether-

net's 10M bit/sec data rate, which is more than 40 times faster than the 230K bit/sec speed supported by Apple's LocalTalk and AppleTalk networks.

Ether+ also includes monitoring and management software that provides statistical information on network performance.

Ether+ costs \$495 and is scheduled to ship in June.

Compatible Systems Corp., P.O. Drawer 17220, Boulder, Colo. 80308, or call (800) 356-0283 or (303) 444-9532.

Short-haul modems link host and parallel peripherals

Datcom Technologies, Inc. recently

introduced short-haul modems that support parallel-to-serial conversion in order to extend the distance that parallel peripherals can be located from a host computer.

The Model 302 and Model 304 Parallel Short Haul Modems enable users to extend the distance a peripheral supporting parallel data can be located from a host computer.

The modems extend that distance from the typical limit of 10 to 15 feet to as much as five miles.

The host-attached Model 302 Parallel Short Haul Modem Transmitter converts parallel data into a serial format. Data in this format can be transmitted at speeds up to 19.2K bit/sec over twisted-pair cable.

At the receiving end, the Model 304 Parallel Short Haul Modem is attached to the peripheral and converts the serial data back to parallel.

The Model 302 and Model 304 Parallel Short Haul Modems also feature status monitor LEDs.

The Model 302 costs \$156, and the Model 304 costs \$182. Rack-mounted versions of both models are available for \$10 less.

Datcom Technologies, Inc., 11001 31st Place W., Everett, Wash. 98204, or call (206) 355-0590.

Sungard, STM plan Toronto disaster recovery center

SunGard Recovery Services and STM Systems Corp. are this week expected to finalize plans to jointly establish a disaster recovery facility in Toronto.

Under the agreement, the companies will establish a new business unit, named STM-SunGard Recovery Services, that will build a disaster recovery center capable of providing backup processing for IBM, Digital Equipment Corp., Tandem Computers, Inc. and Stratus Computer, Inc. computer systems. The new company will offer both hot-site and cold-site recovery backup options. It will also lease office and terminal space, as well as offer backup networking facilities.

A hot site is a room equipped with computers and communications facilities that customers can operate if their own computer center fails. A cold site is a large, controlled-environment computer room in which a user can install backup systems in case of an emergency.

The STM-SunGard facility will also offer IBM Personal Computer-based contingency planning software and an electronic vaulting service in which users will transmit backup copies of data files to a tape storage device in Toronto. SunGard and STM will also establish high-speed communications links between the Toronto center and SunGard's other disaster recovery facilities in Philadelphia, Chicago and San Diego. The Toronto facility will house a team of recovery specialists to assist subscribers during tests and recoveries.

The facility is expected to be operational by July and will initially support IBM equipment; other vendors' equipment will be added later. Prices for IBM disaster recovery services will range from \$4,500 to \$12,000 a month. Recovery services for users of other vendors' equipment will range from \$2,500 to \$8,000 a month.

SunGard Recovery Services, a division of SunGard Data Systems, Inc., 1285 Drummers Lane, Wayne, Pa. 19087, or call (215) 341-8700. STM Systems Corp., 393 University Ave., Toronto, Ont. M5G 2H9, or call (416) 979-3900. □



Digital Network. At Last The Idea Applied To A Digital Data Network.

also error control capabilities that are unmatched by any other existing network. In addition, we've provided a variety of network management features that make it possible to perform diagnostics and help isolate problems as they arise.

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speeds to accommodate changes in daily traffic, the Advanced Digital Network allows you to react instantly. On premises. Even with a PC.

Or, if you prefer, we will change speeds for you at Pacific Bell. It's as easy as giving us a call.

You might ask yourself, "How much is all this control going to cost me?" Our answer is that Advanced

Digital Network costs substantially less, in most cases, than existing digital services.

Pacific Bell. We've gone to great lengths to be the first company to provide the Advanced Digital Network to businesses throughout California.

It's just one more way we're working hard to make your work easier,

PACIFIC BELL

OPINIONS

ANI

BY HOWARD SHIPPEN

Phone users' rights are only part of the issue

Thus far in matters regarding automatic number identification (ANI), discussion of privacy rights has centered on the initiators of telephone calls — those whose number would be forwarded. What about the recipients of calls? Now that the technology is available, shouldn't telephone users be allowed to determine whether they want to *receive* calls from parties who insist on remaining anonymous? The invasion-of-privacy issue doesn't seem to include concern for the invasion of an individual's privacy by endless calls for newspaper and magazine subscriptions, investment opportunities and other unsolicited trivia.

In addition to the issue of telephone users' rights, ANI

presents developers and manufacturers with an economic opportunity that may have serious consequences. Consider the following:

- Telephone companies could make ANI services optional. Customers would determine whether or not their numbers would be forwarded to call recipients.
- Customers would be able to decline non-ANI calls. Unidentified callers would hear

ANI presents manufacturers with a glorious opportunity for free enterprise.

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a message such as: "The number you are calling, NPA-555-XXXX, will not accept your call without your ANI."

- All pay phones would need to be equipped so that calls made from them, including those phones using alternative operator services, would be identified as such immediately.

What a glorious opportunity for free enterprise! Entrepreneurs could open third-party forwarding services for those who wish to make anonymous calls. Anonymous callers would dial the third-party forwarding firm and provide their credit card numbers for billing. The firm would initiate the call to the recipient, displaying the third party's number.

Telephone companies would be forced to purchase additional announcement machines — a boost to the economy — and to upgrade all generic stored-program machines to forward ANI to subscribers. This action would create a market for devices such as display adjuncts to phones for subscribers who wish to use their old phones for the service. It would also spawn a new generation of phones with built-in displays. Perhaps recorders could be developed to date-stamp incoming calls.

Battalions of lawyers could spend their careers arguing about who will pay for uncompleted calls. Liability lawyers would reap a bonanza from party-line users who were misidentified because someone on the party line used a phone with a bridged ringer. Regulators would have an opportunity to escape the mundane problems of economic regulation and plunge into exhilarating arguments on life, liberty and the pursuit of a buck.

Telephone companies could file tariffs for these nonessential services at rates that would more than compensate for the cost of offering the service. Private branch exchanges would have to be redesigned not only to forward the ANI of the station originating the call but also to pass the ANI to all stations on incoming calls. Since telephone companies must serve all who desire the service, every central office would have to be equipped to handle ANI, regardless of whether its clients subscribe to the service. And the cost for all of this would be passed on to the general ratepayer, who doesn't really care and doesn't have a voice in the matter anyway.

Sound ludicrous? Think again; after all, U.S. District Court Judge Harold Greene set the precedent. ■

Shippen is president of Shippen Associates, a telecommunications consulting firm based in Franklin, Mass.

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The Newsworld of User Networking Strategies

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EDITORIAL

Users have too little influence on the politics of standards

True or false: All members of standards committees are impartial experts who base their decisions regarding proposed standards solely on the relative technical merits of the various approaches.

Life would be much easier throughout the communications industry if "true" were the correct answer. But the answer is "false" because the standards process is highly political. More often than not, vendors run the show, and the results sometimes are extremely detrimental to users' interests.

At a recent ANSI conference entitled "The Future of the Voluntary Standards System," U.S. Federal Trade Commissioner Terry Calvani spoke of several ways in which the standards process becomes politicized.

Most often and most obvious, vendors attempt to get their own technology adopted as standard so their competitors' products will be at a disadvantage in the marketplace. In other cases, vendors attempt to dilute the criteria for implementation of a standard so they are not held to the same criteria as their competitors.

Worse, vendors have been known to subvert the standards process by packing committees or working groups with their own supporters.

In the electrical industry, this practice led to a landmark U.S. Supreme Court case in which makers of steel conduit were found to have illegally prevent-

ed certification of plastic conduit for use in building construction.

While the majority of vendors play by the rules, some companies insist upon influencing the outcome of standards decisions through backroom-style dirty politics, instead of taking their chances in the give-and-take of an open standards fo-

Users should make sure they are represented on key standards committees, either as individual companies or as members of users groups.

▲▲▲

rum. The risk of harmful influence peddling is compounded when formal and ad hoc committees and working groups are lax in enforcing quorum requirements and other procedural safeguards.

The temptation to cheat in the standards process is understandable when one considers the enormous economic advantages that accrue to companies whose proprietary techniques are adopted as formal stan-

dards. But users' failure to interest themselves in the standards process becomes less and less understandable as the stakes of the game increase.

Given the inevitably political nature of the standards process, how can users make their voices heard? They can monitor the proposed standards being considered by various committees, and they can indicate their approval or disapproval of each committee's actions by submitting formal written comments.

Users should make sure they are represented on key standards committees, either as individual companies or as members of users groups. They should also insist upon being closely involved in decisions affecting the way standardized products will be tested and certified. Finally, users should have a say in the accreditation of laboratories that will conduct such testing.

The ball is in the court of upper management at many user companies. Top corporate decision makers must recognize that support of standards activities is becoming one of the fundamental costs of doing business in an increasingly high-tech world.

In the election of a government official, election officials are not expected to take into account the opinions of those who don't bother to cast their votes. Similarly, as Calvani observed at the ANSI conference, "Committees are required to consider what has been said, *not* what has not been said." Get involved. ■

OPINIONS

TELECOMMUNICATIONS POLICY

BY GEORGE NEWMAN

Upcoming rulings will determine industry direction

The telecommunications industry is rattling headlong toward the railroad switchyard, and a host of overzealous but well-intentioned engineers are battling for the controls.

Those most actively engaged in telecommunications policy development in the 1980s — the courts and the Federal Communications Commission — have their own distinct visions of how the industry should proceed. In the next two to three years, federal policy rulings and the major service providers' responses will shape the U.S. telecommunications infrastructure well into the next century.

ONA looms large

Although the regional Bell holding companies eventually want to be free of U.S. District Court Judge Harold Greene's Modified Final Judgment restrictions, for now they may actually be happy with the pace of deregulation, despite their public protestations to the contrary.

Due to Greene's March 1988 decision, the RBHCs can offer voice messaging, storage and retrieval. They can also deliver electronic mail and gateway information services such as data transmission, protocol conversion, address translation and billing management.

However, they still are not permitted to offer information content. Before Greene will remove the line-of-business restrictions prohibiting them from entering this market, the RBHCs must prove they've pried open the local bottleneck through their efforts to implement Open Network Architecture (ONA).

Once the FCC has approved their ONA plans, the RBHCs have one year to implement them. But, realistically, initial ONA development will probably occur over the next two to three years. If everything proceeds according to plan (which is doubtful), the RBHCs will eventually obtain greater freedom from Greene.

In the meantime, the RBHCs will test the waters with voice-messaging and voice mail services. Depending on the results

of this market litmus test, ONA unbundling of basic service elements and possible follow-up actions by the FCC and the courts, the RBHCs may choose to compete with information content providers at a later date.

The RBHCs, as we all know, are traditionally averse to taking risks. They should be given the opportunity to offer pilot

National uniformity for technical interface standards is an ONA development problem that must be addressed immediately.

Where Congress fits in

It may take a few years of actual experience with ONA to determine a logical course of action. While Congress must eventually grapple with these is-

The courts and the FCC have their own distinct visions of how the industry should proceed.



programs that are less risky in nature and that appeal to certain vertical market segments.

The RBHCs should seek waivers from the courts to see which of their internal information data bases would be most useful to the enhanced service provider community, the long-distance carriers, businesses, government institutions and the public.

The RBHCs should choose a mix of services that can be implemented with a low incremental cost of investment. They should package or customize information that they already have in their data bases or promote processing services that can be delivered at a minimal cost to the ratepayer.

Now is the time for the RBHCs to perform their market research studies — if they haven't already. The seven Baby Bells must determine which businesses make the most sense for them.

To grease the wheels, the FCC should offer constructive criticism and more definitive guidelines in response to the next ONA amendments, which are due to be issued May 19.

The commission should also set guidelines for national technical standards for network interconnection and force the RBHCs to offer a general set of useful basic service elements for the first phase of ONA.

Integrated Services Digital Network and Common Channel Signaling System 7 are good starting points, but these technical standards are still evolving; other standards will have to be developed for new technologies and services.

sues, it should not intrude at this juncture.

In addition to closely monitoring all proceedings regarding ONA and cable company/telephone company cross-ownership, Congress should wait patiently for Greene's Triennial Review findings due in 1990.

While the FCC addresses ONA and other related issues, Congress should consult with network visionaries and pragmatic economists to draft a bold new telecommunications policy. But this policy should not be created in haste or in reaction to lobbying efforts by the RBHCs, which are now marketing themselves as a competitive hedge against a widening telecommunications trade deficit.

Any telecommunications policy set forth by Congress in the future must address states' rights issues — that is, whether the national policy infringes upon or adversely affects intrastate telecommunications transport.

Clearly, the courts are not fully capable of charting the course for our national public telecommunications carriers. However, Congress should not turn back the hands of time and allow the RBHCs to manufacture customer premises equipment and provide long-distance services.

New regulatory structures would have to be created to manage RBHC entry into these spheres. The slew of legal suits that would follow would constrict public network development and neutralize any progress that has been made over the past five years. ■

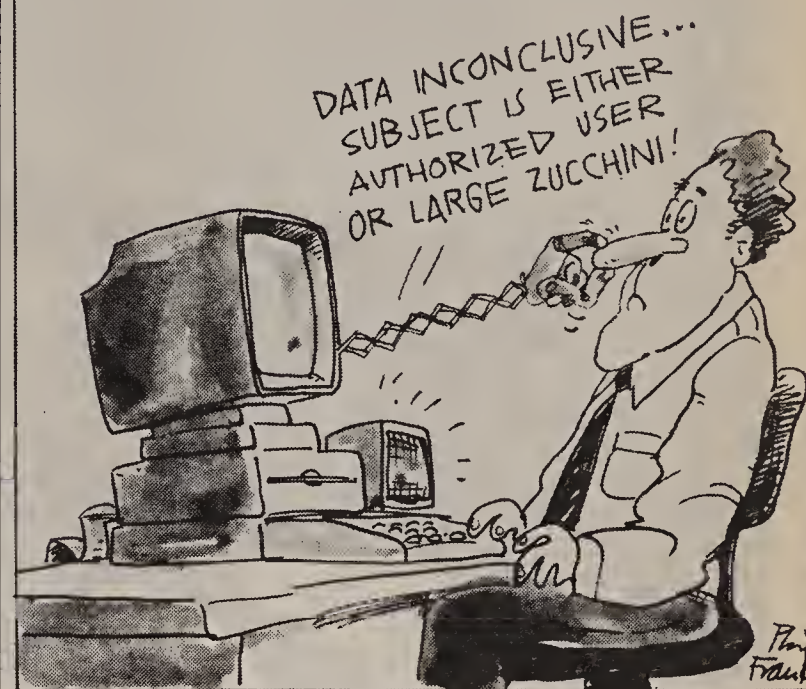
TELETOONS

BY FRANK AND TROISE

The Future of Telecommunications: No. 54

October 10, 1992

Beta-testing begins on a network security device designed to recognize nose prints.



LETTERS

Using ANI to fight pranks

As a residential telephone user, I want to call your attention to a major omission in your editorial "What are the rights of telephone users?" (NW, Feb. 27).

I've been a victim of crank telephone calls, with the phone company and the police both encouraging me to ignore them. The ability to know who is threatening me or making obscene propositions is decidedly worth some inconvenience.

I'm delighted to know that the technology now exists to give me the number of my harasser. I think people have the right to know who is calling them. If automatic number identification (ANI) is

available at a price I can afford, I will definitely buy it.

People with unlisted numbers have paid for the right not to be called by me. However, people who call me have initiated the contact.

In simple justice, I should be allowed to know their numbers so I can call back. Whether or not I should be legally entitled to sell those numbers (continued on page 66)

Network World welcomes letters from its readers.

Letters should be typed, double-spaced and sent to Editor, Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

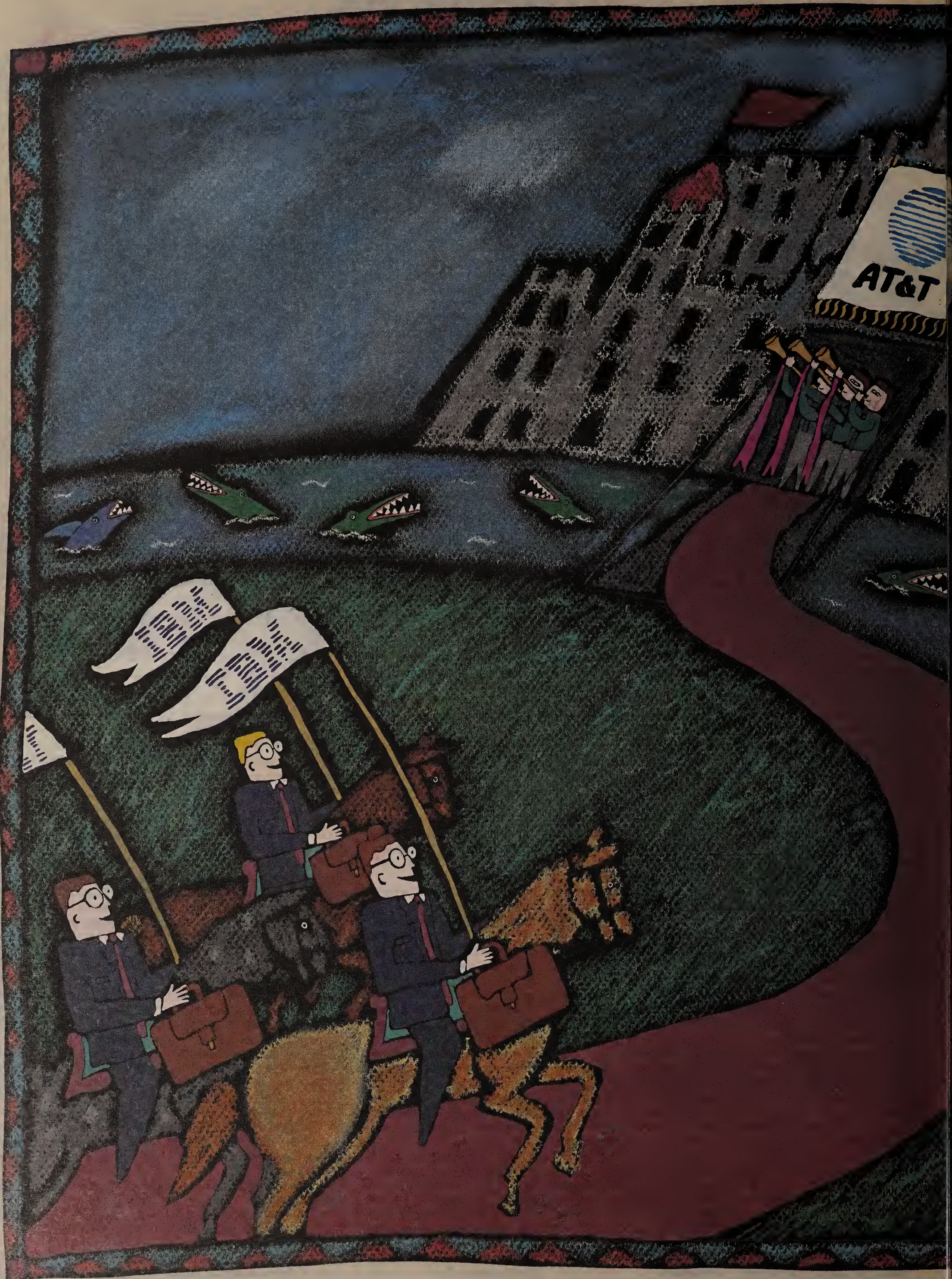
Letters may be edited for space and clarity.

IS ELVIS ALIVE AND WELL and living in Kalamazoo, Mich.? Probably not — but if he were, he would certainly write a guest column for *Network World's* Opinions pages. So why don't you?

Columns should be timely, opinionated, literate, thoughtful and accurate.

Manuscripts should be letter-quality, double-spaced and between 600 and 900 words in length. Disk or modem submissions are preferred.

If you'd like to write a column, contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass. 01701, or call (508) 820-2543, ext. 732.



FEATURES

Lowering the drawbridge

AT&T's Accumaster Integrator opens the telecommunications kingdom to SNA.

CONTINUED FROM PAGE 1

Management Application. SNA, a hierarchical scheme of logically connected network resources, and its network management system, NetView with NetView/PC, do not provide a comprehensive means for managing the non-SNA physical devices that connect logical SNA resources.

UNMA hierarchy

Accumaster Integrator forms the top tier of UNMA's three-tiered architecture, which comprises Network Elements (NE), Element Management Systems (EMS) and the Integration System. NEs are the equipment that constitutes a network, such as modems, multiplexers, communications links, SNA applications and even the SNA host computer. In this first tier, NEs report alarm information to the EMSs.

The second tier, the EMSs, manage the NEs and provide functions such as configuration and fault management. Modem managers, multiplexer managers and even NetView or Cincom Systems, Inc.'s Net/Master — both of

which execute on an SNA host — are all considered EMSs under UNMA.

The final tier of UNMA, the Integration System, communicates with the EMSs using the Network Management Protocol (NMP), which is AT&T's implementation of the International Standards Organization's (ISO) current Open Systems Interconnection network management standards. As the OSI standards become finalized, NMP will be modified to conform to them. Accumaster Integrator Release 1.1 functions as the Integration System, consolidating and integrating network management data, which it receives from the EMSs, for configuration and fault management.

SNA integration

The SNA Management Application, which performs the integration of logical SNA net management data, is a joint development effort of AT&T and Cincom Systems. Net/Master, a direct competitor of NetView, provides the means of SNA data collection from an SNA host computer.

The SNA Management Application consists of two components, Cincom Systems' recently announced UNMA Application and AT&T's recently announced SNA Interface Application, which resides on Accumaster Integrator. The UNMA Application is an optional value-added feature for the base Net/Master product, and it provides the interface between an SNA-based EMS, such as Net/Master or Net-

(continued on page 43)

Sackett is president of ASAP Technologies, Inc., a Rutherford, N.J., consultancy and education firm specializing in Systems Network Architecture network management and VTAM/Network Control Program. He is the author of two books: Introduction to SNA Networking and Advanced SNA Networking, published by McGraw-Hill Publishing Co.

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Suzette Barbier ©1989

V.32 at 38,400 bps.



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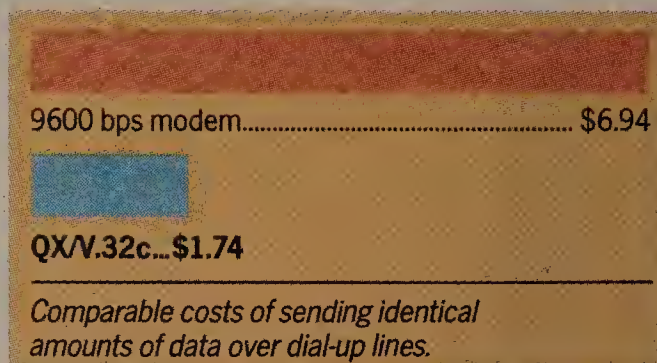
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We couldn't make our dial-up modems any more accurate. So we made one twice as fast. And it's available today.

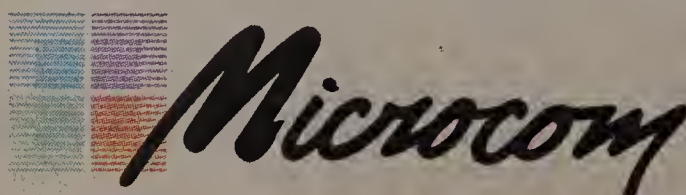
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(continued from page 41)

View, and Accumaster Integrator. The UNMA Application provides SNA-EMS functionality support for the three IBM main-frame operating systems: MVS, VM and VSE.

The UNMA Application requires IBM's VTAM, as well as Cincom Systems' Net/Master Version 2.1 base product. The Net/Master Version 2.1 base product includes Operator Console Services, which is the equivalent of NetView's Command Facility, and the Network Error Warning System, which provides the same functionality as NetView's Hardware Monitor.

Other features included in the Net/Master Version 2.1 base product are Inter-Net/Master Communication with Inter-system Routing, which is equivalent to NetView-to-NetView communications, and the core of the Net/Master product, Network Control Language. Together, these features are called Advanced Network Management.

For complete SNA session alarm integration, Cincom Systems' Network Track-

tence module is designed not to impair the functionality of NetView as the SNA network management application.

Integrating data

SNA Management Application provides the necessary logic for integrating SNA network management data. The configuration management services of this feature supply the network operator with an accurate, up-to-the-minute view of the managed SNA network. The network operator can perform three types of configuration queries: the Logical Unit Query, the Peripheral Node Query and the Session Route Query.

■ With a Logical Unit Query, the network operator asks the UNMA Application on the SNA host for a logical connectivity map of the logical unit's controlling equipment.

The response to this request not only shows the SNA hierarchical relationship, but also the status of each resource.

■ The Peripheral Node Query operates in a similar manner, retrieving a textual display of all the logical units that the queried peripheral node controls. A color-coded icon, indicating the status of each logical unit controlled by the peripheral node, is included in the display. When obtaining data with Logical Unit and Peripheral Node Queries, integration does not play a major role.

■ For the Session Route Query, integration is a key factor. A Session Route Query not only obtains the logical SNA connectivity, it also graphically depicts the physical components that make up the logical connection.

For example, these components could

be the modems, facilities, multiplexers and data switches that comprise the logical link connecting a cluster controller to a communications controller. In response to the Session Route Query, the operational status of both logical and physical resources is shown via the color-coded display.

SNA Management Application fault management has a value-added feature to support SNA session alarms, which frequently occur when logical unit-to-logical unit sessions are broken, such as during power outages, link failures, forced failures from VTAM operator commands and even invalid session-establishment parameters.

The alarm status window, at the top of Accumaster Integrator's user interface presentation display, immediately notifies

(continued on page 44)

The UNMA Application provides SNA-EMS functionality support for the MVS, VM and VSE operating systems.

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ing System, an optional feature of Net/Master, is required. In addition, a new optional feature, a multidomain SNA resource status monitor called Net/Stat, is also needed.

The network manager defines the SNA resources that Accumaster Integrator manages using rules that govern Net/Stat's monitoring of SNA resources. The UNMA Application obtains configuration and fault management data for the SNA network based on these rules.

The UNMA Application transmits configuration data to the Integrator on the following SNA resources: System Services Control Points, Network Control Programs, cluster controllers, managed application logical units, SNA links and multipoint links. Subsequently, Accumaster Integrator reports fault management data on these resources.

In a multidomain SNA network environment, the UNMA Application resides on one SNA host computer. To be included in Accumaster Integrator, the Net/Master base product must also be running on the remaining SNA hosts, which use Net/Master's Inter-system Routing to route the configuration and fault management data to the UNMA Application.

SNA networks managed by NetView require an additional Net/Master-NetView coexistence module of the UNMA Application. This coexistence module uses standard SNA and VTAM interfaces to extract network management data from the NetView-managed host.

Each NetView-managed SNA host in the network requires the Net/Master Version 2.1 Advanced Network Management product as well as the coexistence feature. Only one of the NetView-managed SNA hosts requires the UNMA Application. The coexis-

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Protocol and vendor independent.

VigiLAN is designed to work independently of vendor-specific equipment or particular protocols.



User-friendly menus with predefined statistics reports and network tests.

VigiLAN functions may be accessed by selecting menus with function keys to make it easy to use for technical and non-

technical network administrators. Predefined statistical reports provide useful real-time information to identify station bandwidth usage, error rates, traffic patterns and incorrect station routing.

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Network security.

Unlike protocol analyzers, VigiLAN does not rely on the storing of network packets to provide network statistics. Rather, it performs real-time packet processing on network packets, thus preserving the confidentiality of the network information.

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(continued from page 43)
a network operator of SNA session alarms.

Network configuration

The UNMA Application and Accumaster Integrator communicate by multiple logical units. Using SNA/Synchronous Data Link Control as the data link protocol,

tolcol/Internet Protocol. Using X/Windows and a mouse, the network operator can access any feature on the display.

The menu-driven user interface allows the user to define network configuration maps, which can be 16 levels deep. For example, the highest level may be a global network configuration of

The alarm severity icons are based on the six severity types supported in NMP and are color-coded: critical (red), major (orange), minor (yellow), warning (cyan), informational (cyan), normal (green) and cleared. Another icon for SNA session alarms also appears on the alarm status window. The color-coded alarm severity icons make it easy to recognize alarm severities on the graphic configuration map displayed with the fault management application. The user can customize the color code for each severity type. The alarm status window gives the network operator an overall view of network status.

Each alarm severity icon displays the number of alarms received by Accumaster Integrator for that severity type. When the mouse is used to "click" on the alarm severity icon, a list of active alarms is displayed. The list includes the type of object being alarmed, the date and time of the alarm, and a brief description of it. The list of active alarms can be reviewed by the network operator to take ownership of or responsibility for the alarm.

An operator takes ownership of an alarm by clicking on the alarm status icon for that specific alarm and selecting the "ownership" option. Once an alarm is operator-owned, the operator's logon identification is placed next to each alarm. This "operator alarm ownership" feature of Accumaster Integrator's fault management application reduces duplicate recovery efforts.

All alarms received by Accumaster Integrator are placed in the active alarm list window. Here too, operator IDs are listed next to each alarm. This simple notification tells the network manager and the other operators which alarms are being managed and by whom.

With the fault management message set of NMP, alarms can also be cleared. Once corrective action has been taken and the failing object has been recovered, the EMS for that object sends a message to Accumaster Integrator clearing the alarm.

The color code of the object's icon on the fault management map then changes from that of the original alarm severity to that of normal or in-service status. Thus, the network operator knows the object is now functioning.

Accumaster Integrator Release 1.1 provides three types of terminal emulation. This allows a network operator to access any attached EMS through a "cut-through" window.

Currently, VT-100, teletype-writer terminal and SNA/3270 terminal emulation are supported to access the EMS operational displays, execute tests and display detailed analysis.

SNA/3270 terminal emulation can be used to access not only NetView and Net/Master, but also any SNA/3270 application

executing on the SNA host computer, such as CICS, IMS or TSO.

Correlation

The integration of fault information about all network elements culminates in the correlation of network alarms. Correlation on Accumaster Integrator Release 1.1 is currently provided by a rule-based system, configuration data and the order in which alarms are received. Using this feature, the network operator can determine the most probable cause for related alarms.

Take, for example, the following scenario. End users are in session with multiple SNA host applications. From an SNA perspective, the end-user terminals are attached to a cluster controller remotely attached to a communications controller, such as an IBM 3725, using an SDLC 9.6K bit/sec link. The configuration map on Accumaster Integrator, however,

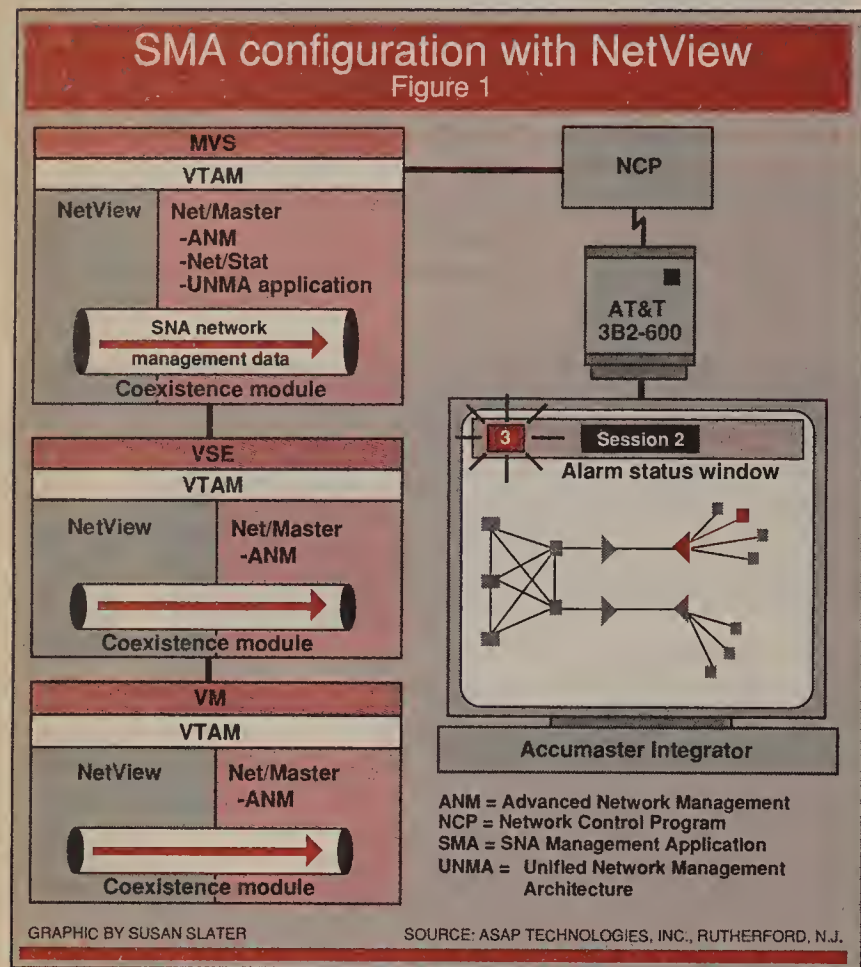
along this route also reflect the current status of each object, based on alarms received by Accumaster Integrator.

From this display, the network operator selects the corresponding button. Accumaster Integrator alters the session route display to reflect the most probable cause for the SNA session alarm.

In this case, it correlates the SNA session alarm to a problem with the remote multiplexer. Clicking the mouse on the highlighted multiplexer lists all the active alarms pertaining to the multiplexer. But this is not conclusive evidence as to why the SNA session was alarmed.

The network operator then clicks on the SNA link for the remote cluster controller on the fault management monitor display and selects the correlating option.

In this case, the correlation also indicates that the alarm on



the NMP configuration and fault messages are embedded within SDLC frames. The use of multiple logical units ensures full-duplex communications. This means that dedicated logical unit-to-logical unit sessions are used to support inbound and outbound NMP message data flow between the UNMA Application and Accumaster Integrator for both configuration and fault management.

Accumaster Integrator must emulate an SNA resource type to communicate with the UNMA Application. The 3B2/600 minicomputer on which Accumaster Integrator is based emulates an SNA Node Type 2. The SNA resource emulation on Accumaster Integrator Release 1.1 is provided by AT&T's SNA/3270 Emulator+ software package along with the Intelligent Synchronous Controller (ISC) card available for AT&T 3B2 minicomputers.

Connectivity to the SNA network is via a dedicated 9.6K bit/sec line between the Integrator's ISC card and the SNA communications controller (for example, an IBM 3745). By using standard SNA connectivity, the UNMA Application and the SNA Interface Application can effectively exchange messages.

User interface

The vehicle for the graphic user interface of Accumaster Integrator Release 1.1 is a Sun Microsystems, Inc. 3/60 Workstation. Currently, five of these workstations can be connected to Accumaster Integrator's 3B2/600 minicomputer with Starlan using Transmission Control Pro-

the major network hubs. Lower levels may be regional areas, several connected data centers or data center configurations themselves. Each object on the configuration map is represented by an icon.

Information obtained from the configuration record loaded by the EMS consists of the object name, parent equipment, child equipment, object type and the name of the controlling equipment of the object.

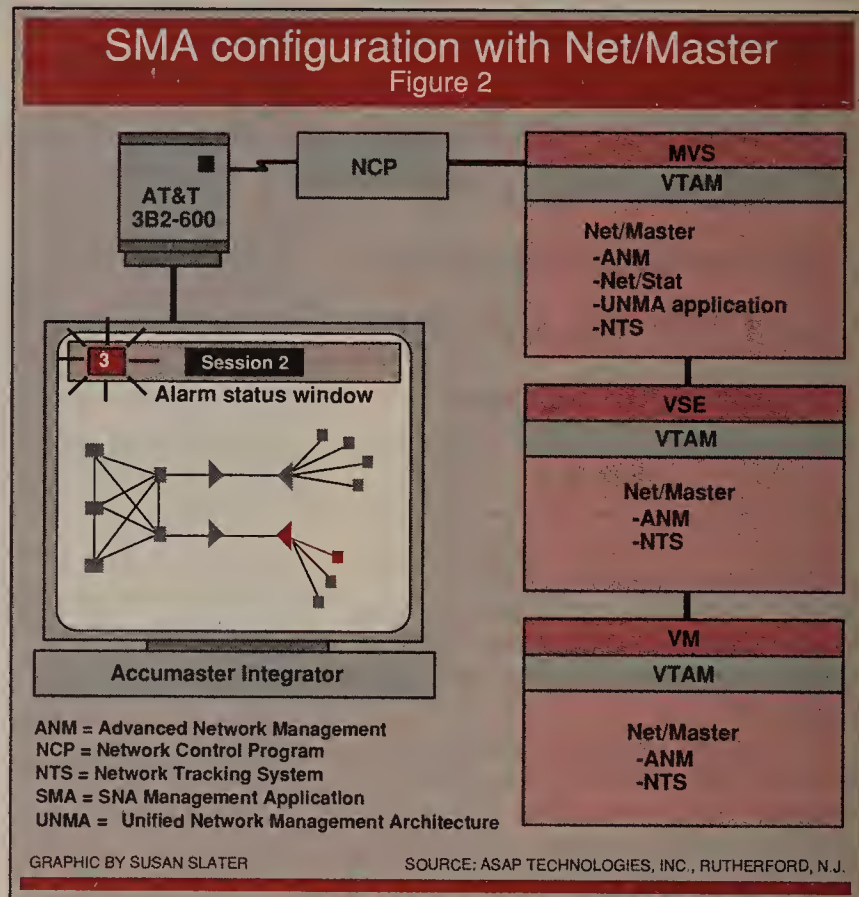
When defining the configuration map, the user may enter additional data — such as serial numbers, service contacts, re-

Accumaster Integrator Release 1.1 provides three types of terminal emulation.



lease levels and location — to the configuration record for each object defined in the network. The configuration maps are used in conjunction with fault management.

As previously mentioned, at the top of the user interface display is an alarm status window, along which color-coded alarm severity icons appear.



depicts the true end-to-end configuration.

Accumaster Integrator receives alarms from the SNA/EMS, the multiplexer EMS and the modem EMS. In addition, the SNA/EMS has sent several SNA session alarms. The network operator sees the link and all the intervening components that make up that link suddenly turn red, which is the critical severity color code. The network operator reacts by clicking the mouse on the SNA session alarm icon displayed on the alarm status window.

Accumaster Integrator presents a list of SNA session alarms to the network operator. Upon viewing the list, the network operator notices that several alarms have appeared. The network operator selects one of the session alarms and receives a list of options, one of which is "Display Route."

After selecting the Display Route option, the logical SNA session route mapped to the physical session route appears on the network operator's screen. The icon representations of the objects

the remote multiplexer is the most probable cause for the SNA link alarm.

With this information, the operator deduces that the main problem for all the alarms received for the SNA link alarm and the SNA session alarm is a port outage in the multiplexer. The network operator then uses the cut-through window to access the multiplexer EMS and take corrective action. This is one example of how correlation of fault management data through integrated physical and logical network configuration data reduces problem analysis and problem resolution times.

Accumaster Integrator with SNA Management Application is not a replacement for NetView or Net/Master. The provision of one interface to manage all network devices, integrating logical and physical components of disparate vendors and providing the ability to correlate alarms from the different vendor components offers clear advantages for network operations and management. ■



LAN

ANALYZERS /

MANAGERS

The troubleshooters

By JOHN HUNTER

Shalom Fried, a member of the technical staff at Nynex Corp.'s Science and Technology Division in White Plains, N.Y., spends his time looking for trouble. Although he is concerned about tokens, transfers and buses, he's not planning to take a ride on urban transit. He's a member of a new and growing corps of networking experts — those who find and solve problems that plague local networks. It's not an easy task.

Network managers are finding that local net analysis products from different vendors don't work the same way or with the same level of efficiency, especially at the higher protocol levels. And some equipment doesn't conform to the standards of the Institute of Electrical and Elec-

Hunter is president of TMS Corp., a telecommunications consulting firm in Wayne, Pa.

tronics Engineers, creating problems that are headaches to solve.

For instance, when packets addressed to different network segments fail to cross a bridge, is the problem in the bridge or in the unit issuing the address? If there's a high incidence of packet collisions on an Ethernet, can it be attributed to increased traffic alone or are the transceivers at fault?

Many products on the market today promise to solve local net problems. All deliver to one extent or another, and all appear to perform overlapping services. However, all have distinct differences as well.

Three choices

Local net testers fall into three general classes: protocol analyzers, real-time test and measurement equipment, and time-domain reflectometers (TDR). Protocol analyzers can detect line breaks or shorts in the trans-

port media, as can TDRs. But while protocol analyzers can only detect the problem to within feet of its actual location, TDRs can pinpoint the problem to within inches.

Test and measurement gear can perform protocol analyzer-like services such as trapping a user-specified network event, for instance, a line break, collision or protocol mistake. However, it can evaluate data only to Level 2 of the Open Systems Interconnection model, while most protocol analyzers can scrutinize data to at least Level 4.

In addition to the products listed in the protocol analyzer chart beginning on page 47, others are available that permit testing of individual local net components.

Cabletron Systems, Inc.'s LAN-MD, for instance, operates on both active and inactive net-

(continued on page 48)

CHART • GUIDE

The features and prices of various protocol analyzers are listed in a chart on page 47.

The features and prices of various network testing equipment are listed in a chart on page 58.

The features and prices of various time-domain reflectometers are listed in a chart on page 62.



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NETWORK WORLD

Protocol analyzers (continued on page 58)

Vendor	Product	LAN compatibility	Hardware	Protocols analyzed	Protocol layer level decoding	Capture buffer size (bytes)	Smallest packet/frame captured (bytes)	Pattern-match filters	Filter capacity (bytes)	Remote LAN/monitor control	Errors detected	Reports generated	Price
Data General Corp. Westborough, Mass. (508) 368-8911	DG-1	Starlan	Lap-top PC with Intel Corp. 80286, 32K to 4M RAM, 40M hard disk, 512K intermediate RAM	TCP/IP, ISO, XNS, XNS/MS-Net, NFS, NetWare, DG/X.25, X/Windows	All 7 layers	3M	NA	16	32	Yes	1, 2, 3, 4, 5	1, 2, 3, 4, 5	\$16,000
	Dasher-286	Ethernet and Starlan	IBM Personal Computer AT with 640K to 26M RAM, 20M hard disk, 512K intermediate RAM	TCP/IP, ISO, XNS, XNS/MS-Net, NFS, NetWare, DG/X.25, X/Windows	All 7 layers	256K to 1.5M	NA	16	32	Yes	1, 2, 3, 4, 5	1, 2, 3, 4, 5	\$16,000
Digilog, Inc. Montgomeryville, Pa. (215) 628-4530	Ethernet Analyzer	IEEE 802.3 Ethernet and Starlan	PC card for IBM Personal Computer XT, AT, Personal System/2, or Unix and Digital Equipment Corp. VAX PCs; 80286 and 512K RAM	TCP/IP and DOD	All 7 layers; Layer 1 free and others optional	480K	14	8	2K	Yes	1 through 7	1 through 6	\$9,500
Excelan, Inc. San Jose, Calif. (408) 434-2300	EX 5300	IEEE 802.3 Ethernet and Starlan	PC circuit card for IBM Personal Computer XT, AT with 80286 and 2M RAM	TCP/IP, XNS, DECNet, AppleTalk, MS-Net, NFS, ISO, NETBIOS	To Layer 4	2M	2	16	128	Yes	1 through 7	1 through 6	\$9,500
	EX 5500 LANalyzer	IEEE 802.3 Ethernet and Starlan	Compaq Computer Corp. portable PC with 80286, 2M RAM, 20M hard disk	TCP/IP, XNS, DECNet, AppleTalk, MS-Net, NFS, ISO, NETBIOS	To Layer 4	2M	2	16	128	Yes	1 through 7	1 through 6	\$15,000
Hewlett-Packard Co. Fort Collins, Colo. (303) 229-3800	HP 4972A	IEEE 802.3 Ethernet	Stand-alone unit with Motorola Corp. 68010, 2M RAM, 20M hard disk	TCP/IP, DECNet, XNS	To Layer 4	1M	14	16	60	Yes	1 through 6	1 through 6	\$17,350
Network General Corp. Mountain View, Calif. (415) 965-1800	IBM 4M bps Token-Ring Sniffer, IBM 16M bps Token-Ring Sniffer	IEEE 802.5 Token Ring	Models 301, 304: lap-top PC with 80286, 4M RAM, 16K intermediate RAM, 40M hard disk; Models 401, 404: portable PC with 80286, 640K to 2.64M RAM, 20M hard disk; Models 501, 504: Compaq portable PC with 80386, 6M to 10M RAM, 40M hard disk; Models MS 501, MS 504: PC board for Compaq portable PC with 80386 microprocessor; 16K RAM	IBM Token-Ring, NetWare, XNS, MS-Net, TCP/IP, NFS, ISO, NETBIOS, 3+, Nestar Plan, VINES, AppleTalk, X/Windows	All 7 layers	Models 301, 304: 3M, Models 401, 404: 256K to 3M, Models 501, 504: 5M to 8M, Models MS 501, MS 504: 5M to 8M (depending on Compaq PC version used)	NA	16	32	Yes	1, 2, 6	1, 2, 3, 4	Models 301, 304: \$15,750, Models 401, 404: \$19,000 to \$24,000 (for dual-system facility), Models 501, 504: \$24,000, Models MS 501, MS 504: \$12,500; \$995 to \$1,995 for each protocol converter
	IBM PC Broadband Sniffer	IEEE 802.4 Token Bus	Model 405: portable PC with 80286, 640K to 2.64M RAM, 20M hard disk; Model 505: Compaq portable PC with 80386, 6M to 10M RAM, 40M hard disk; Model MS 505: PC board for Compaq portable PC with 80386 microprocessor; 16K RAM	IBM Token-Ring, NetWare, XNS/MS-Net, TCP/IP, NFS, ISO, DECNet, VINES, 3+, X/Windows	All 7 layers	Model 305: 3M, Model 405: 256K to 3M, Model 505: 5M to 8M, Model MS 505: 5M to 8M (depending on Compaq PC version used)	NA	16	32	Yes	1, 2, 5, 6	1, 2, 3, 4	Model 305: \$15,750, Model 405: \$19,000 to \$24,000 (for dual-system facility), Model 505: \$24,000, Model MS 505: \$12,500; \$995 to \$1,995 for each protocol converter
	Ethernet Sniffer, Starlan Sniffer	Ethernet Sniffer: IEEE 802.3 Ethernet, Starlan Sniffer: IEEE 802.3 Ethernet and Starlan	Models 302, 307: lap-top PC with 80286, 4M RAM, 512K intermediate RAM, 40M hard disk; Models 402, 407: portable PC with 80286, 640K to 2.64M RAM, 512K intermediate RAM, 20M hard disk; Models 502, 507: Compaq portable PC with 80386, 6M to 10M RAM, 512K intermediate RAM, 40M hard disk; Models MS 502, MS 507: PC board for Compaq portable PC with 80386 microprocessor; 16K RAM	IBM Token-Ring, NetWare, XNS/MS-Net, TCP/IP, NFS, ISO, DECNet, VINES, AppleTalk, 3+, X/Windows	All 7 layers	Models 302, 307: 3M, Models 402, 407: 256K to 3M, Models 502, 507: 5M to 8M, Models MS 502, MS 507: 5M to 8M (depending on Compaq PC version used)	NA	16	32	Yes	1, 2, 5, 6	1, 2, 3, 4	Models 302, 307: \$15,750, Models 402, 407: \$19,000 to \$24,000 (for dual-system facility), Models 502, 507: \$24,000, Models MS 502, MS 507: \$12,500; \$995 to \$1,995 for each protocol converter
	Arcnet Sniffer	Datapoint Arcnet	Model 306: lap-top PC with 80286, 4M RAM, 16K intermediate RAM, 40M hard disk; Model 406: portable PC with 80286, 640K to 2.64M RAM, 20M hard disk; Model 506: Compaq portable PC with 80386, 6M to 10M RAM, 40M hard disk; Model MS 506: PC board for Compaq portable PC with 80386 microprocessor; 16K RAM	NetWare, Nestar Plan, VINES, X/Windows	All 7 layers	Model 306: 3M, Model 406: 256K to 3M, Model 506: 5M to 8M, Model MS 506: 5M to 8M (depending on Compaq PC version used)	NA	16	32	Yes	1, 2, 6	1, 2, 3, 4	Model 306: \$15,750, Model 406: \$19,000 to \$24,000 (for dual-system facility), Model 506: \$24,000, Model MS 506: \$12,500; \$995 to \$1,995 for each protocol converter
Spider Systems, Inc. Burlington, Mass. (817) 270-3510	Spider Monitor K-150	IEEE 802.3 Ethernet	Circuit card for IBM Personal Computer XT, AT with 80286, 512K RAM	TCP/IP, ISO, XNS, DECNet	To Layer 4	512K	64	4	46	Yes	1 through 5	1 through 6	\$7,850
	Spider Monitor K-200	IEEE 802.3 Ethernet	IBM Personal Computer-based with 640K RAM, 80286, 20M hard disk	TCP/IP, ISO, XNS, DECNet	To Layer 4	512K	64	4	46	Yes	1 through 5	1 through 6	\$11,900
Tektronix, Inc. LP Com Division Mountain View, Calif. (415) 987-5400	TC 1000	IEEE 802.3 Ethernet and Starlan	PC circuit card for IBM Personal Computer XT, AT with 80286, 512K RAM	TCP/IP, XNS, DECNet, AppleTalk, MS-Net, NFS, ISO, NETBIOS	To Layer 4	2M	2	16	NA	Yes	1 through 7	1 through 6	\$11,600

ERRORS DETECTED KEY

- 1 = Cyclic redundancy check
- 2 = Frame/packet alignment
- 3 = Runts
- 4 = Jabber
- 5 = Ethernet preamble
- 6 = Wrong address
- 7 = Interframe gap error

REPORTS GENERATED KEY

- 1 = Absolute time when each packet received
- 2 = Percentage of available bandwidth in use
- 3 = Percentage of errors by error type
- 4 = Number of packets transmitted with and without errors
- 5 = Collision and abort attempt count
- 6 = Traffic analysis histogram

DOD = Department of Defense
 ISO = International Standards Organization
 NA = Information not available
 NFS = Sun Microsystems, Inc.'s Network File System

3+ = 3Com Corp. OS
 VINES = Banyan Systems, Inc. OS
 XNS = Xerox Corp.'s Xerox Network Systems

(continued from page 45)

works, ensuring that transceiver cables conform to Ethernet IEEE 802.3 specifications and detecting any shorted or open pins.

LAN-MD also checks the internal circuits of transceivers and verifies that the power supply, transmit/receive and collision detection circuits are operating correctly. All test results are displayed on built-in indicators.

Transceiver checking is especially important since many local nets include third-party components that do not conform to IEEE 802.3 specifications.

Siecor Corp.'s Portable Ethernet Transceiver Tester (PETT) ensures that those specifications are met by checking transceiver transmit, receive and collision characteristics. PETT does this by generating

its own packet and bit patterns, and by displaying the results via LEDs.

Tests consist of transmit/receive verification, preamble test, jabber test and forced collision test. An interface is also provided to enable third-party test and measurement products to measure bit error, jitter and propagation delay.

For broadband local networks (IEEE 802.4), Wavetek Corp. RF Products Division's Bidirectional Interactive Test System 4000 measures the radio frequency data carrier levels, carrier-to-noise ratio and hum modulation.

A built-in signal generator measures round-trip signal attenuation (loop loss) from any point in the net, and transmit/receive frequencies can be tuned anywhere from 5 MHz to 450 MHz. All test results are shown on a built-in signal-level meter.

One of the high-profile products among local network testers is the protocol analyzer, a device that usually has a personal computer platform and permits users to monitor for specific events or conditions, trap them in a capture buffer and dissect them to determine the cause of the problem.

The old-timers in this market are Excelan, Inc. and Hewlett-Packard Co., but lately they've been joined by Data General Corp., Network General Corp., Spider Systems, Inc., Tektronix, Inc.'s LP Com Division, Ungermann-Bass, Inc. and VANCE Systems, Inc. (DG's product line is actually a Network General Sniffer, while the Tektronix LP Com product is made by Excelan.) Digilog, Inc. will join the fray some time in late spring with an as yet unnamed product manufactured by Frontier Soft-

ware of Chelmsford, Mass.

According to preliminary data obtained by *Network World*, Digilog will package its protocol analyzer on a printed circuit card that plugs into an expansion slot on a personal computer. That packaging, pioneered by Excelan, allows the personal computer to lead a dual life as a protocol analyzer and a standard personal computer. Spider Systems, Tektronix LP Com and Ungermann-Bass also use such packaging.

Network General's MS-Series Sniffer is also a personal computer retrofit product, but it uses a snap-on module that attaches to the back of a Compaq Computer Corp. 286 or 386 personal computer.

All vendors except Digilog and Ungermann-Bass offer total system packages consisting of the protocol analyzer hardware and software integrated in a personal computer or stand-alone unit. Excelan, Tektronix LP Com and Network General use the Compaq portable, thus creating a unit that field service employees can carry easily.

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It is much less expensive to buy the protocol analyzer board and marry it to a lower cost portable clone than to buy the packaged system.

▲▲▲

Compaq unit. VANCE Systems has a portable unit too, but it includes a proprietary hardware platform. As the chart shows, it is much less expensive to buy the protocol analyzer board and marry it to a lower cost portable clone than to buy the packaged system.

Analyzer services

Protocol analyzers can be used for developing, debugging, testing and analyzing local networks. Users can name the channels or individual terminals to be tested, the types of errors to be sensed and collected, the time of day when tests should be conducted and so on. Users can also specify exact bit-pattern triggers.

All protocol analyzers permit the user to set limits on the size of the packets and frames to be captured, thus preventing the capture buffer from becoming clogged with very small packets, or data runs.

Typical detectable error conditions are cyclic redundancy check; frame alignment; data runs caused by collisions or a mismatched transceiver and repeater; jabber when a transceiver transmits a packet that is longer than normal; Ethernet preamble errors; illegal network addresses; and interframe gap errors. Summaries and global information about test data can be presented in real time or printed out in hexadecimal, ASCII characters or both.

Nynex's Science and Technology Division is using HP 4972As for Ethernet planning and troubleshooting such problems as the failure of packets to reach different segments.

"We're using [network] routers, and occasionally some packets don't get routed"

(continued on page 58)

True tales from LAN managers:

"Our LAN used to be total confusion."

Manager of Network Development
University System



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LANs:	Protocols:	• Token-Ring
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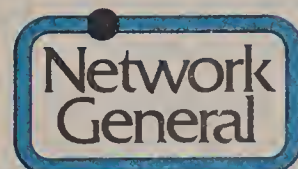
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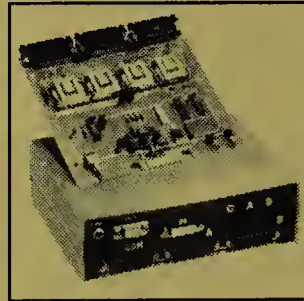
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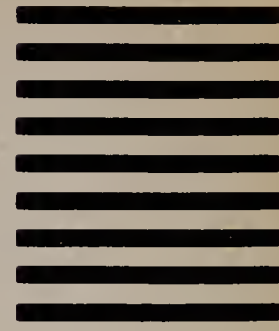
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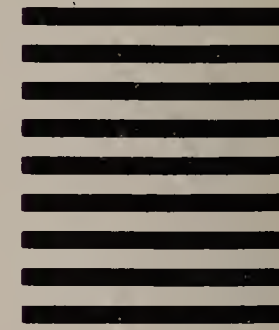
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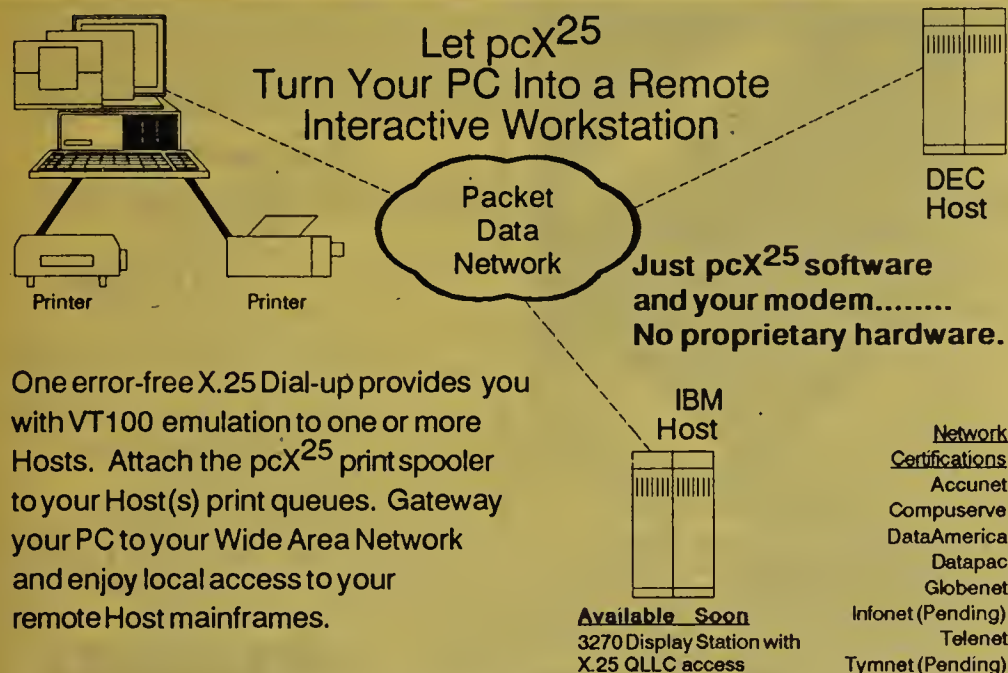
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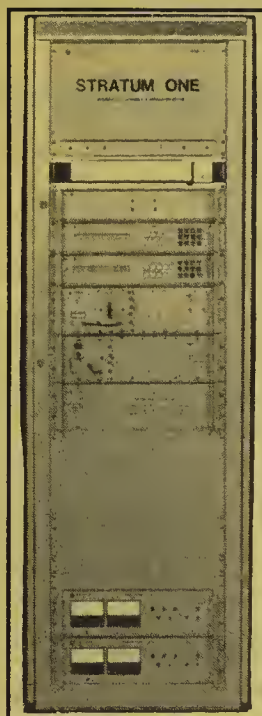
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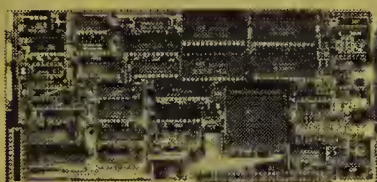
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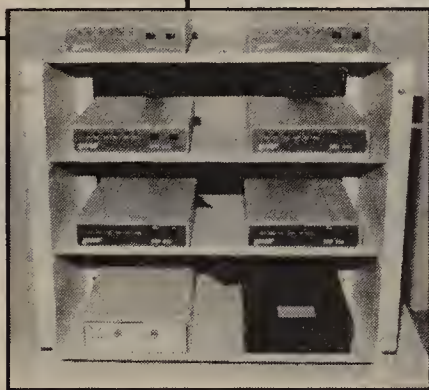
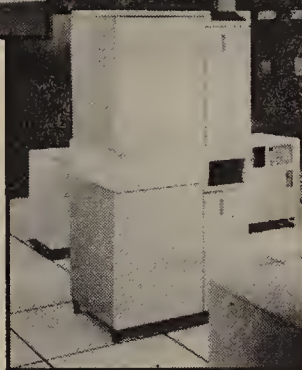
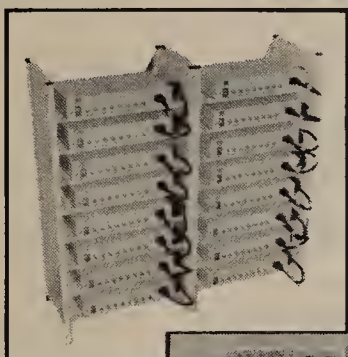
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UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT COURT OF NEW YORK

In re

Chapter 7 Case No.
87 B 10020 (PBA)ARGO COMMUNICATIONS CORP.,
Debtor.

NOTICE (i) OF HEARING ON PROPOSED SALE OF DEX 400 TELEPHONE SWITCHES OWNED BY TRUSTEE LOCATED IN SAN FRANCISCO AND MIAMI (ii) SOLICITATION OF EXPRESSIONS OF INTEREST IN MICROWAVE RADIOS AND OTHER RELATED TELEPHONE SWITCH AND COMMUNICATIONS EQUIPMENT OWNED BY TRUSTEE

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SELLER: John S. Pereira, as Chapter 7 Trustee of Argo Communications Corp., Debtor.

FOR FURTHER INFORMATION CONTACT: A. Peter Lubitz, Esq., Fulbright Jaworski & Reavis McGrath, attorneys for Trustee, 345 Park Avenue, New York, New York 10154; (212) 486-9500 or John Pereira, Trustee, 150 E. 52nd Street, New York, New York 10022; (212) 758-5777.

Dated: New York, New York
March 9, 1989

FULBRIGHT JAWORSKI & REAVIS McGRATH
Attorneys for Trustee
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Protocol analyzers (continued from page 47)

Vendor	Product	LAN compatibility	Hardware	Protocols analyzed	Protocol layer level decoding	Capture buffer size (bytes)	Smallest packet/frame captured (bytes)	Pattern-match filters	Filter capacity (bytes)	Remote LAN/monitor control	Errors detected	Reports generated	Price
Tektronix continued	TC 2000	IEEE 802.3 Ethernet and Starlan	Compaq Computer Corp. portable PC with Intel Corp. 80286, 512K RAM, 20M hard disk	TCP/IP, XNS, DECnet, AppleTalk, MS-Net, NFS, ISO, NETBIOS	To Layer 4	2M	2	16	NA	Yes	1 through 7	1 through 6	\$14,500
3Com Corp. Santa Clara, Calif. (408) 562-6400	NetProbe	Ethernet IEEE 802.3, 802.5	Software product that runs on IBM Personal Computer XT, AT; requires 640K RAM	TCP/IP, XNS, EtherTalk	To Layer 7 on XNS; Layer 4 on others	64K	64 for Ethernet, 18 for token ring	None; triggers on source and destination address only	Not applicable	Yes	None	1	\$995
TRW, Inc. Information Networks Division Torrance, Calif. (213) 373-9161	LanStat	Ethernet	External box and software, works with IBM Personal Computer XT, AT and contains Motorola Corp. 68000, 768K RAM	TCP/IP	To Layer 4	256K	NA	None; triggers on source and destination address only	Not applicable	Yes	1, 2	2, 4	\$2,995
Ungermann-Bass, Inc. Santa Clara, Calif. (408) 496-0111	NetScope	NA	PC card for IBM Personal Computer XT and AT with 80186 and 82586, 512K RAM	XNS, TCP/IP, NETBIOS, MS-Net	To Layer 4	64K	14	16	NA	No	1 through 5	1 through 6	\$7,500
VANCE Systems, Inc. Chantilly, Va. (703) 471-9402	ATS 1000	IEEE 802.4, 802.5	Stand-alone or portable with 80286 and Advanced Micro Devices, Inc. 2900; 1M RAM, 40M hard disk	All	To Layer 2	500K	1	NA	NA	Yes, rebuilt monitor	1, 2, 6, token errors	1, 2, 3, 4, 6	\$23,000

ERRORS DETECTED KEY

- 1 = Cyclic redundancy check
- 2 = Frame/packet alignment
- 3 = Runts
- 4 = Jabber
- 5 = Ethernet preamble
- 6 = Wrong address
- 7 = Interframe gap error

DOD = Department of Defense
 ISO = International Standards Organization
 NA = Information not available
 NFS = Sun Microsystems, Inc.'s Network File System

REPORTS GENERATED KEY

- 1 = Absolute time when each packet received
- 2 = Percentage of available bandwidth in use
- 3 = Percentage of errors by error type
- 4 = Number of packets transmitted with and without errors
- 5 = Collision and abort attempt count
- 6 = Traffic analysis histogram

3+ = 3Com OS
 VINES = Banyan Systems, Inc. OS
 XNS = Xerox Corp.'s Xerox Network Systems

This chart includes a representative selection of vendors in the protocol analyzer market. Most vendors offer other products, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., WAYNE, PA

Troubleshooters

continued from page 48

ed correctly," says Nynex's Fried. "The protocol analysis [facilities] help determine why through the link-level information."

Protocol analyzers are not limited to troubleshooting problems; they are also frequently used in network development.

"Their traffic-generating fa-

cilities allow us to load the network and determine the effect new stations will have," says Ken Mossman, a customer services planner for Prime Computer, Inc. in Milford, Mass. By introducing increased traffic, Prime can determine if the incidence of collisions will increase and if overall network response will degrade.

In addition, Prime uses Spider Systems' Spider Monitor K-150 in

combination with a Zenith Data Systems Zenith Portable to certify new networks. "A lot of the networks use third-party components, and we have to determine if they're all compatible. We also use [the K-150's] TDR feature to detect cable problems," Mossman says.

While Mossman says he generally likes the K-150, he would like to see the protocol analysis facili-

ties raised above OSI Level 4 and the captured data automatically transferred to disk.

"We want to do more detailed analysis of protocols, and Level 4 [diagnostics] isn't enough. We'd also like the data [in the capture buffer] to be automatically spooled [to disk]. Now we have to stop sampling and [initiate a data transfer to disk] manually," Mossman says. According to Spi-

der Systems, both shortcomings will be remedied soon.

Spider Systems' product isn't the only one that suffers from the Level 4 limitation. Others are also limited to the first four levels of the OSI model. Automatic spooling may or may not be a problem, depending on the duration of the test and the size of the sample being taken.

(continued on page 60)

Network testing and measuring equipment

Vendor	Model	LAN capability	Capture buffer size (bytes)	Pattern-match filters	Bit-by-bit analysis	Packet generation	Errors detected	Mute/deaf node detection	Test reporting	Remote test capability	Reports generated	Price
Cabletron Systems, Inc. East Rochester, N.H. (603) 332-9400	LAN Specialist	Ethernet	500K	6	Yes	Yes	1, 2, 3 and collision detection	Yes	Interface to printer, ASCII terminal or PC with Digital Equipment Corp. VT 220 emulation	Yes	2 through 4	\$7,995
Concord Communications, Inc. Marlborough, Mass. (508) 460-4646	Token/Scope	IEEE 802.4	16K	8	Yes	Not applicable	1, 3	Yes	Through dumb terminal, interface provided for oscilloscope	Yes	4, 5	\$33,000 for broadband, \$28,500 for carrier band
Experdata, Inc. Bloomington, Minn. (612) 831-2122	E30/ES VigilAN	IEEE 802.3 Ethernet and Starlan	128K to 256K	4	Yes	Yes	1 through 7 and collision detection	Yes	PC with analysis software, printer interface	Yes, via slaved units	1 through 6	\$5,200, \$500 for analysis software
	E20	Ethernet	Not applicable	Not applicable	Yes	Yes	1 through 7	Yes	LCD display	No	None; all results displayed	\$4,500
Hewlett-Packard Co. Fort Collins, Colo. (303) 229-3800	LAN Probe	IEEE 802.3 Ethernet and Starlan (10M bit/sec)	750K	26	Yes	No	1 through 7	Mute only	Produced by controlling PC	Yes, via slaved units	1 through 6	\$8,000 for remote unit, \$5,000 for ProbeView PC-resident software

ERRORS DETECTED KEY

- 1 = Cyclic redundancy check
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- 6 = Traffic analysis histogram

This chart includes a representative selection of vendors in the network testing and measuring equipment market. Most vendors offer other products, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., WAYNE, PA

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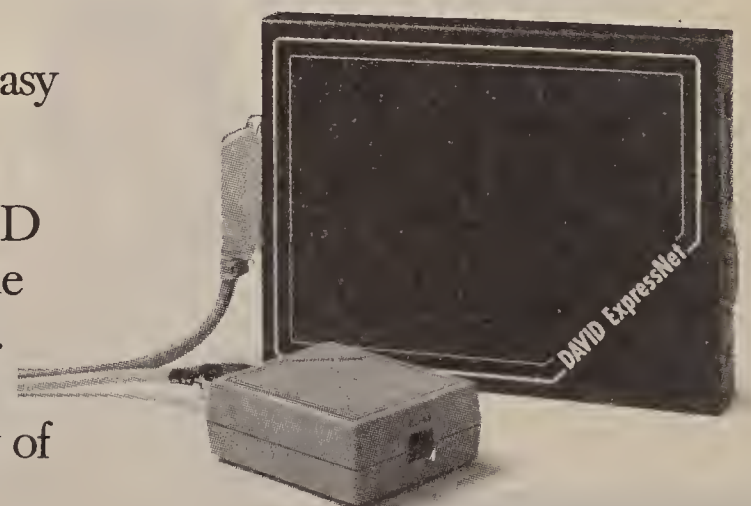
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(continued from page 58)

The token-ring local net is the fastest growing segment of the local network market; and while most of the vendors contacted for this article claim to be working on products to test them, only Network General and VANCE Systems have deliverable systems.

The VANCE Systems ATS 1000 offers real-time emulation, whereby users enter parameters — such as fields, field sizes, contents and source and destination addresses — and concurrently run simulated traffic against them to observe both the effects on performance and any errors generated. The emulation ability is very useful for capacity planning and also shows the effect of increased traffic on network components such as bridges.

The ATS 1000 is also the only product in this survey that does not become an actual station on the network. Therefore, it cannot be overtly or covertly disabled by someone attempting to take control of the network. This feature is particularly important in military applications.

DMA better?

All of the products in the network testing and measuring equipment chart on page 58 use a wraparound capture buffer. With this technology, when the buffer's capacity is reached, the

stored data is overwritten by new data, unless the contents are moved to the personal computer disk or to random-access memory. All of the protocol analyzers transfer data from capture buffer to disk, except the Sniffer family and the VANCE Systems product, both of which move data to RAM via a direct memory access (DMA) operation.

Both companies opted for DMA because they believe disk controllers are too slow to transfer large volumes of data quickly enough due to bus transfer and disk controller limitations.

VANCE Systems claims to have solved the bus contention problem by using a dual-processor configuration consisting of an Intel Corp. 80286 microprocessor, which handles routine system functions, and a separate Advanced Micro Devices, Inc. (AMD) 2900 microprocessor to gather the monitored data. Associated with the AMD 2900 is a VME bus that transfers data directly to RAM.

For those not wishing to invest in hardware to get DMA-level performance, there are RAM-disk programs that let a personal computer gain such functionality.

Testing and measurement equipment is intended primarily to allow the network manager to

designate tests and view the results in real time. Therefore, it lacks the sophisticated built-in reporting facilities of protocol analyzers. Further, while the test and measurement products in the chart can perform many of the same tests as the protocol analyzers, they come up short in their ability to decode protocol errors. Layer 2 is the best they can do.

Testing and measurement equipment lacks the sophisticated built-in reporting facilities of protocol analyzers.

▲▲▲

Test and measurement gear tends to be battery-powered and portable, and it generally sells for between one-quarter and one-half the price of most protocol analyzers. It is an ideal field service troubleshooting tool, and it can generate and capture pack-

ets, measure round-trip delays and the volume of traffic on the network, check transmitter/receiver circuits, perform cable checks and observe network events such as packet collisions.

As noted earlier, the reporting mechanisms of this gear are limited, ranging from LCD dot matrix displays and LCD readouts to small thermal printers. Many test and measurement units also have interfaces for outputting test results to a terminal, oscilloscope or printer.

Cabletron Systems' LAN Specialist is a good example of one of the more sophisticated Ethernet products in this class. The size of an attache case, it furnishes configuration screens for establishing network tests and allows six trace filters to be defined.

The contents of the captured packets are displayed in hexadecimal, ASCII characters or both via an interface to a dumb terminal or personal computer emulating a Digital Equipment Corp. VT-220. A printer interface is furnished for printing out hard copies of displayed information.

Black boxes

Regardless of the equipment's portability, there are times when it's impractical or impossible to send technicians to a site to detect problems.

There are two alternatives for remote diagnostics: Place a protocol analyzer at the test site and communicate with it over telephone lines, or use a slaved "black box" that attaches to the local net and communicates findings to a central diagnostics site.

All protocol analyzers in this chart can be deployed and programmed remotely to monitor user-defined events, and all except the forthcoming Digilog product and the Ungermann-Bass NetScope can also be remotely controlled through products such as Meridian Technology Corp.'s Carbon Copy or software furnished by the vendor.

The black box approach is represented by HP's new LAN Probe and Experdata, Inc.'s E30/ES VigilAN. Both employ relatively low-cost slave units that attach to the local net and perform monitoring. They do not, however, have the facilities to perform data reduction and to generate reports. Instead, the captured data is transmitted to a "master" personal computer, which contains vendor-supplied software that performs test analysis and report generation.

Stanford University in Palo Alto, Calif., currently uses LAN Probe to catch intermittent problems as well as to gather statistics (continued on page 62)

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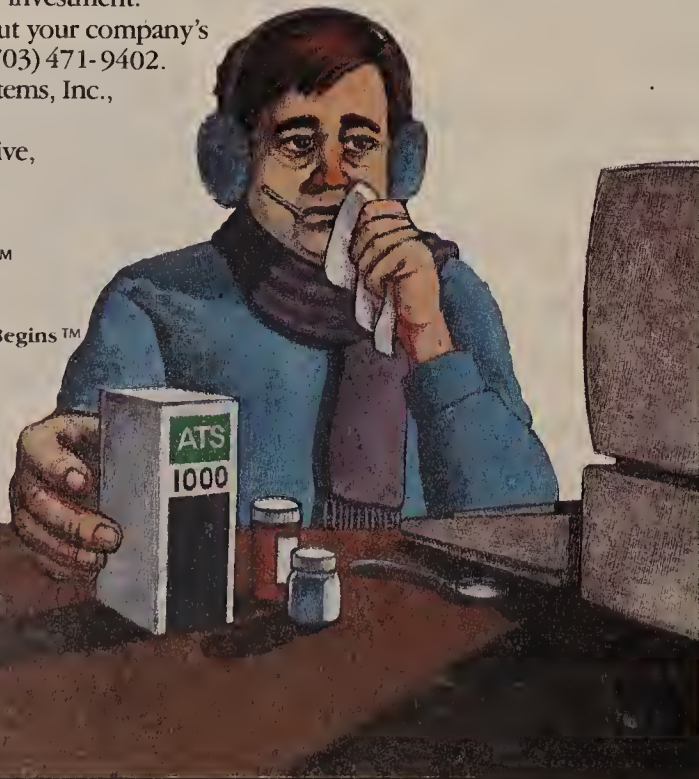
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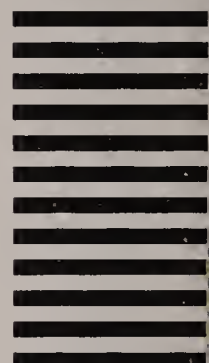
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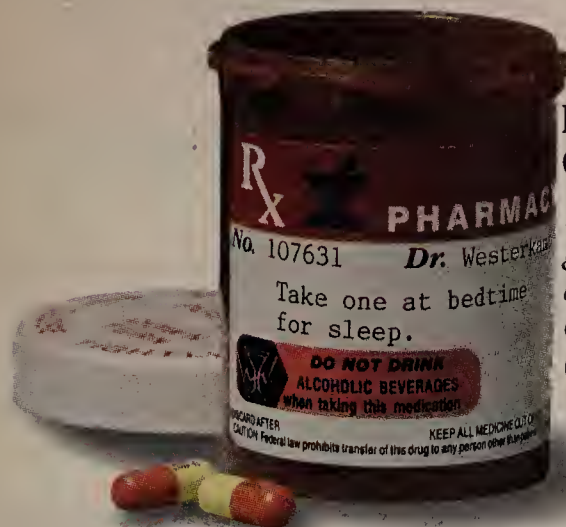
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NETWORK WORLD

Time-domain reflectometers

Vendor	Product	Cable type tested	Faults detected	Collision simulation	Test range	Absolute accuracy	Fault resolution	Test range sensitivity	Pulse repetition rate	Recording/reporting method	Price
Experdata, Inc. Bloomington, Minn. (612) 831-2122	E10-N	Coaxial, twisted pair, all metallic pairs	Opens, shorts, impedance discontinuities/mismatches	Yes	Short cable: 15 to 1,100 feet, 10 nsec pulse out; long cable: 100 to 11,000 feet, 100 nsec pulse out	Plus or minus 1% of reading	1 foot short cable; 10 feet long cable	20 db RL to 40 db RL	0.5 microsec	5-character LCD display, oscilloscope interface	\$1,095
	E12	Coaxial, twisted pair, all metallic pairs	Opens, shorts, impedance discontinuities/mismatches, faulty connectors, water problems	Yes	Short cable: 15 to 1,100 feet, 10 nsec pulse out; long cable: 100 to 11,000 feet, 100 nsec pulse out	Plus or minus 0.01% of reading	0.5 foot for short or long cable	42 db RL	0.5 microsec	128 x 256 dot matrix LCD, shows waveform, built-in thermal printer	\$4,395
Tektronix, Inc. Communications Network Analyzers Division Redmond, Ore. (503) 923-0333	Model 1503B	Coaxial, twisted pair, twinaxial, all metallic pairs	Opens, shorts, impedance discontinuities/mismatches, faulty connectors, water problems, crimps, cuts, open leg, splits	Yes	Short cable: 1 to 1,000 feet, 2 nsec pulse out; long cable: 400 to 50,000 feet, 1,000 nsec pulse out; 35 to 5,000 feet, 100 nsec pulse out	Plus or minus 2% of reading	1 foot	68 db RL	NA	128 x 256 dot matrix LCD, shows waveform, thermal printer optional	\$4,600; \$950 for printer
	TMA 802	Coaxial, twisted pair, all metallic pairs	Opens, shorts	No	Short cable: 10 feet; upper limit distance NA, 15 nsec, pulse out; long cable: lower limit distance NA, upper limit 28,182 feet with 37 microsec pulse out	Plus or minus 4 feet	NA	NA	NA	16-character LCD; oscilloscope interface	\$2,495
	OF 150 Fiber Optic TDR	Single/multimode fiber-optic	Signal loss, propagation loss, splice loss	Not applicable	Short cable: 6.5 km (3 db average loss/km, 15 nsec pulse long cable: 9.5 km (3 db average loss/km) 55 nsec pulse	Plus or minus 0.3%	2.5 cm	4.65 kHz	NA	CRT, LCD	\$13,500
3Com Corp. Santa Clara, Calif. (408) 562-6400	LANScanner	Coaxial, twisted pair, all metallic pairs	Opens, shorts, impedance discontinuities/mismatches	No	Short cable: not applicable, long cable: 20 to 11,000 feet, step signal pulse out	Plus or minus 1%	2 feet	Detects 5% change in impedance	NA	Two-line LCD, 16 characters per line	\$1,495

db = decibel
NA = Information not available
nsec = nanosecond
RL = Range limit

This chart includes a representative selection of vendors in the time-domain reflectometer market. Most vendors offer other products, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., WAYNE, PA.

(continued from page 60)
on network traffic. Stanford has about 60 local networks on campus, so "it's impossible to have people going around monitoring them all," says Phil Urquiza, senior network engineer.

"We put the Probes at different points around campus, and they report data back over the Ethernet network." (LAN Probe can also communicate over telephone lines through its built-in modem.)

HP claims that LAN Probe is easy to install, and the reports and graphic representations of the test results are simple enough that someone with no knowledge of Ethernet can understand them.

Urquiza agrees with these claims about ease of installation, stating that users are installing LAN Probe themselves. However, he could not comment on whether "nontechnies" can understand the reports. "We're all pretty technical around here," he says.

Is it really cheaper?

The LAN Probe and E30/ES VigilAN approach, according to their vendors, is more cost-effective than using high-priced protocol analyzers to do the job. That's probably true if you're buying multiple protocol analyzers, but not if just one is involved.

As the chart shows, each LAN Probe costs \$8,000, plus \$5,000 for the control and data analysis software residing on the master-control personal computer. The software price, fortunately, is a onetime charge and will service all Probes on the network.

A board-level protocol converter such as Ungermann-Bass' NetScope, on the other hand,

costs \$7,500, plus the price of the personal computer.

Mary Gardner, product marketing manager for LAN Probe, concedes that the \$13,000 fee for the hardware and software combination is probably too steep to win business in the single-quantity marketplace if price is the only consideration, but that's not the case when more than one location is involved.

and Lotus Development Corp.'s Lotus 1-2-3 spreadsheet.

Low profile

While protocol analyzers and testing and measurement equipment are the high-profile products among local network testers, TDRs are strictly support players. Primarily used to check the integrity of the backbone medium and connector cables, TDRs test for

ity test pulses and can potentially be dangerous to transceivers because IEEE 802.3 does not specify legal positive pulses and transceivers have no positive voltage protection. Therefore, the transceiver must be disconnected before tests are run.

TDRs that use a negative-polarity test pulse will not harm transceivers and thus can be used on active networks. Examples in-

that its Model 1503 B has a proprietary scheme that performs tests on networks containing traffic without harming transceivers or corrupting data.

Fiber-optic cable is gaining popularity as a backbone medium now that its price has decreased and IBM's 16M bit/sec Token-Ring is on the market. However, the only fiber-optic TDR now available is the Tektronix OF150 Fiber Optic TDR, a portable unit that measures reflective cable breaks and cable splice loss on a per-fiber basis.

Best choice

For all-around testing, the protocol analyzer is the product of choice. It detects the same network problems as testing and measurement gear but provides protocol analysis that is two levels higher. In addition, it is flexible enough to allow users to program their own tests. Protocol analyzers also have TDR capabilities, albeit not as precise as the real thing.

As for TDRs, what they do, they do superbly; without them, local nets would be short-circuited.

Testing and measurement equipment is less expensive and ideal for field service workers. Its fault-monitoring capabilities cover the most common local net maladies, and the results can be viewed in real time.

However, the test reporting capabilities of this equipment are fairly basic. For this reason, testing and measurement equipment often requires assistance from other equipment — such as external dumb terminals and printers — to display its findings. ■

TDRs test for opens, shorts, crimps, impedance discontinuities and mismatches, faulty connectors, water in cable and so forth.



"Once you move into multiple segments, the costs for [protocol analyzer] boards and PCs mount quickly, and you'll also need a modem for each location. LAN Probe has its own [modem]," Gardner says. She also emphasizes that "the simplicity of our reports is a big selling point, and someone without a Ph.D in Ethernet can understand them."

The Experdata E30/ES VigilAN looks like a bargain at \$5,200 for the remote unit and \$500 for control software. The vendor says its software costs one-tenth as much as LAN Probe's because the control software has no facilities for establishing a data base for collected data and no means for producing reports.

Experdata claims, however, that E30/ES VigilAN's output data is suitable for interfacing with Ashton-Tate Corp.'s dBase II

opens, shorts, crimps, impedance discontinuities and mismatches, faulty connectors, water in cable and so forth. They also have signal-generating facilities and can simulate packet collisions on an Ethernet (see the TDR chart on this page).

TDRs use the same basic principles as radar: A pulse is sent along the cable, and faults reflect some of the pulse energy back to the originating point, where it is displayed as a waveform and indicates the fault's location. Each fault type has its own distinct waveform; a cable short's waveform, for example, has a distinct drop at the point of the fault.

There are two classes of TDRs: those that perform tests on active networks, and those that require all traffic to be halted and Ethernet transceivers to be disconnected. The latter uses positive-polar-

clude Experdata's E10-N and E-12, and Tektronix Communications Network Analyzers Division Models 1503 B and TMA 802.

While negative polarity (also called N-pulse) TDRs won't harm the transceivers, any test pulse longer than 10 nsec could cause a high incidence of packet collisions because such pulses are "wider" than one bit time. Collisions also occur because TDRs don't follow Ethernet rules when accessing the network. In addition, there is the chance that the generated pulses will corrupt regular network traffic data.

Many N-pulse TDRs get around those problems by generating a signal that simulates a packet collision on the network, which causes all stations to go into a back-off mode and stop transmitting; then the test pulses are generated. Tektronix claims

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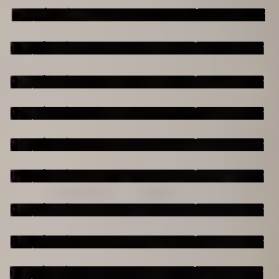
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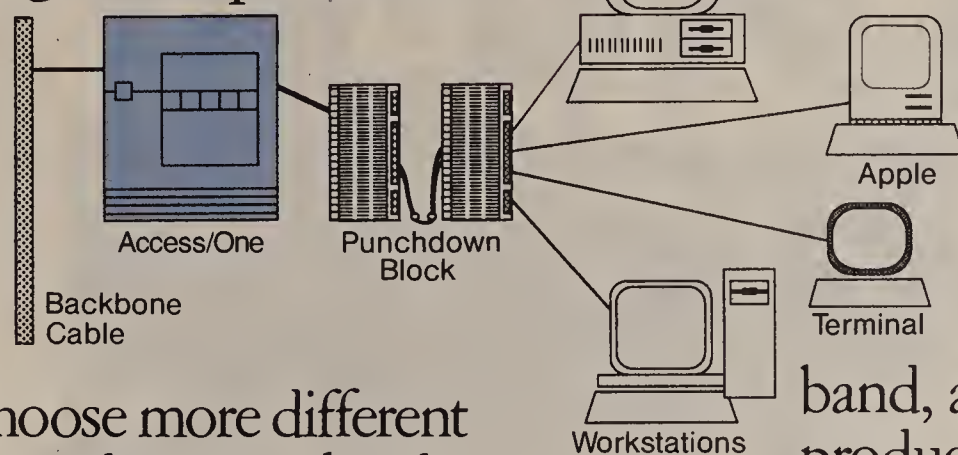
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Letters

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is another question. The problem is telemarketing, not ANI. I think we definitely need some laws controlling telemarketing.

If a telemarketer has my number, ANI isn't going to take it away. If I can get his number, that simply makes matters a little more equal.

Pat Langendorf
Rome, N.Y.

More about VSATs

As I am quoted in the article on very small aperture terminals "Heaven-sent solutions" (NW, Jan. 30), I am interested in submitting these comments.

If VSAT transmission applications are viewed on a stand-alone basis, it is true

that video is expensive and the voice quality is not adequate for most applications.

However, when video for teleconferencing and voice for serving remote areas, conferencing or backup applications are added to a data VSAT system, the customer obtains an extraordinary bargain. This is due to the fact that the VSAT system can be paid for by data network cost reduction while providing much higher reliability than the terrestrial network it displaces.

Video can then be added for a very low incremental cost (approximately \$500 per VSAT). By renting occasional-use video transponder space (\$600 per hour) and an uplink service, video broadcasts for training, product announcements, presidential speeches and so forth can become a low-cost reality. Add-on voice economics are also very attractive.

Second, the statement that the inability of satellites to switch data is a drawback is true, but all but one of the vendors listed in the chart provide packet switches as part of their full-service offering. These switches are often manufactured from terrestrial switch vendors such as Telematics International, Inc. and do all the switching needed to provide full network services.

Finally, I think spread spectrum was unfairly dealt with in the article. Its drawbacks were reported correctly, but its advantages compared to the other access methods that are available were not.

To set the record straight, spread spectrum's inbound access advantages are:

- Lower response times for traffic consisting of a large number of short messages.
- No collisions and subsequent retransmission delays.

■ More efficient utilization of inbound satellite resources.

■ Lower cost and lower complexity hardware.

My comments in the article as to the relative role of inbound channel cost (which is typically only 10% of total space segment cost) apply to all access methods, not just spread spectrum. My intention was to downgrade the emphasis usually placed on the access methods of all vendors. I would much rather have the reader concentrate on issues such as response time, packets per second through the network, and network management and recovery via alternate disaster recovery backup facilities.

One final point: As stated in the article, of course when the hub fails, the network dies. VSATs can operate at multiple data rates (for example, 9.6K bit/sec and 56K bit/sec) and not just the 56K bit/sec figure cited in the article. Therefore, terrestrial backup is feasible for a VSAT system.

A preferred backup, uniquely available via satellite, is to switch traffic over to a backup hub facility such as those available from several of the vendors listed in the article, or a disaster backup specialist such as Vitacom Communications.

I agree with the final conclusion of the article that VSATs are "almost heaven-sent" for companies with astronomical telephone bills.

I also ask that readers include the factors of reliability, catastrophe backup, handling mixtures of data, voice and video, and high data rate capacity in their analyses of VSATs.

Philip Arst
President
Communications Strategies
Associates, Inc.
Cupertino, Calif.

Author's reply —

I disagree with Arst's blanket statement that the savings realized from data/network cost reductions make voice and video an "extraordinary bargain." The savings all depend on the size of the network and the distances involved.

One-way video on a satellite costs \$600 per hour plus \$500 per VSAT, and that's not cheap by most companies' standards. It would take a lot of data traffic going to many points to offset those costs. In fact, VSATs might begin losing their price advantage over terrestrial facilities now that charges for T-1 are dropping and fractional T-1 services are available, as are expanded digital access and cross-connect system services.

Regarding his criticism of my conclusion concerning the use of terrestrial backup for hubs, I stated in the article that data rates of 9.6K bit/sec and below are supported by VSATs, not just 56K bit/sec, as he mentions. The point is that it takes many low-speed telephone circuits to compensate for a failed hub and that the ability to transmit higher data rates hinges on the availability of services such as switched 56K bit/sec service, digital data service and T-1.

He's right that backup hub services can be used to compensate for a failed hub, but that can be an expensive solution once you figure in the cost of transmitting data, voice and video to and from the backup hub and, of course, the charges for the hub service itself.

I agree that VSATs are excellent alternatives for catastrophe backup and for handling high data rates. Those points were made in the article.

— John Hunter

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Equipment maker picks SuperNet

continued from page 2

hoping to ease the strain on its mainframes. "This won't cause us to unplug one of our mainframes at the computer center, but it will probably keep us from upgrading or having to buy another one," Curtis said.

While building local network applications reduces reliance on mainframe processing, corporate headquarters cannot afford to completely sever the mainframe umbilical cord. "A lot of files we have are just too large for a file server," Curtis said.

As a result, headquarters staff must submit batch requests to assemble data — which Dresser's hosts collect from each of the company's worldwide operating divisions — into files that are then downloaded to corporate headquarters. That data is used by local net devices to prepare such things as corporate ledger sheets, consolidated earnings reports and tax statements.

Curtis said Dresser has a NetWare network in each of its six administrative departments. Those networks currently support six file servers, but Curtis expects that number to double by year end. Currently, about half of the 200 Personal Computers at Dresser headquarters are attached to twisted-pair wire Ethernets running NetWare.

The local networks are linked to the SuperNet and one another over a backbone Ethernet supporting the Transmission Control Protocol/Internet Protocol. Personal Computer users are presented with a menu asking whether they want to run a file server-resident application or access the host via an emulation session. When users select 3270 terminal or RJE emulation, they are routed via the TCP/IP backbone to the SuperNet device, which runs the terminal-emulation software.

Personal Computer users can also route print jobs via the local network to a SuperNet-attached laser or serial printer. SuperNet-attached terminals can also send jobs to those printers.

The local nets and the SuperNet replaced two minicomputers and a cluster controller that were used to link 3270 terminals to the hosts. A Motorola Corp. Series 5000 minicomputer running a word processing application had supported 64 3270-type terminals and had provided RJE emulation for sending batch processing requests to the host.

Dresser also used an older Harris 3274-compatible cluster controller to link 3270-type terminals to the host, as well as an AT&T 3B2 minicomputer that ran Mitek Systems Corp. software to provide a link between its attached terminals and one of Dresser's mainframes.

The company was able to swap its leased Harris cluster controller for a leased SuperNet, Curtis said. For a monthly fee of \$2,201, Dresser receives a SuperNet

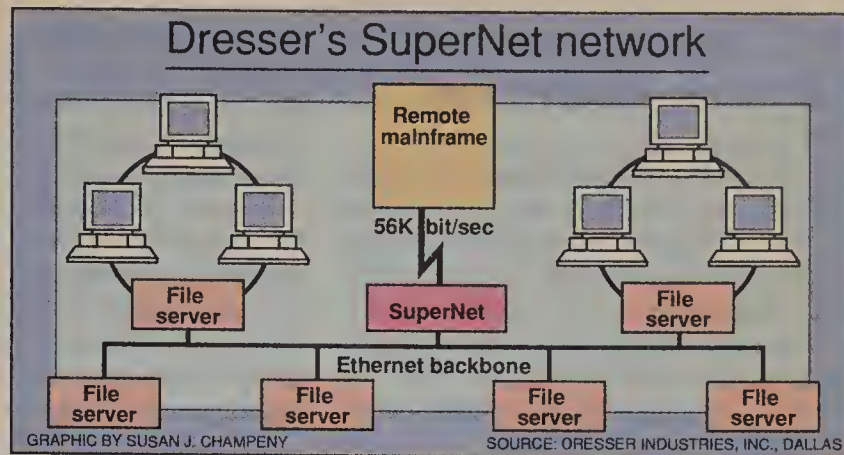
9620-34 Model 30 with 4M bytes of memory, an Ethernet connection, nine 3270-compatible color terminals and a 1,250-line-per-minute printer.

Dresser was also able to cancel its \$15,000-a-month rental agreement for the Motorola minicomputer. The SuperNet device also enables the firm to put the

3B2 it purchased to other uses.

Dresser passed up bids from Motorola, AT&T and IBM in favor of the Harris device. "[Motorola, AT&T and IBM] promised they could do the things we wanted. But they couldn't demo it," Curtis said.

Harris, on the other hand, acquired a NetWare operating system and configured a SuperNet to show that it could support the functions Dresser required. ■



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Finally, there's a common sense twisted pair Ethernet solution.

When you're installing and diagnosing a LAN, most products will have you searching through switch closets and down cable lines. Usually, that means working when nobody else is.

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FCC Patrick calls it quits as chairman

continued from page 1

who also served on Bush's transition team.

Sikes acknowledged that he is being considered for the job but said he does not know when a decision will be made on Patrick's successor. In an earlier interview with *Network World*, Sikes said he would take a position with the FCC only if he was named chairman. If appointed, Sikes would likely continue Patrick's drive toward deregulation and push for more market freedom for the regional Bell holding companies. While heading the NTIA, Sikes petitioned the FCC to allow the RBHCs to enter the information services market.

The Bush administration may also have to name a fourth nominee to the FCC later

this year if Commissioner Patricia Diaz Dennis leaves after her term expires June 30. It is unclear whether Diaz Dennis will be reappointed or whether she even wants to stay on in the position.

Patrick, 37, said his decision to leave was based on two factors: He wants to return to the private sector, and he said he has "essentially" accomplished the agenda he set forth for the agency. He joined the FCC as a commissioner in 1983 and was appointed chairman in April 1987.

In his resignation letter to Bush and at a press conference last week, Patrick indicated passage of price cap regulation was his most important achievement. Price cap regulation places ceilings on the prices a carrier can charge rather than limiting profit levels, as is done under rate-of-return regulation.

Other important achievements cited by Patrick were passage of Open Network Architecture (ONA) and the Third Computer Inquiry. ONA required the RBHCs to offer equal quality network access to competing information services providers. Computer III established guidelines for how AT&T and the RBHCs could provide enhanced services in the future.

Patrick said the debate over customer-specific discounts in AT&T's Tariffs 12 and 15 is "extraordinarily important" because the goal of increasing competition is to create price competition.

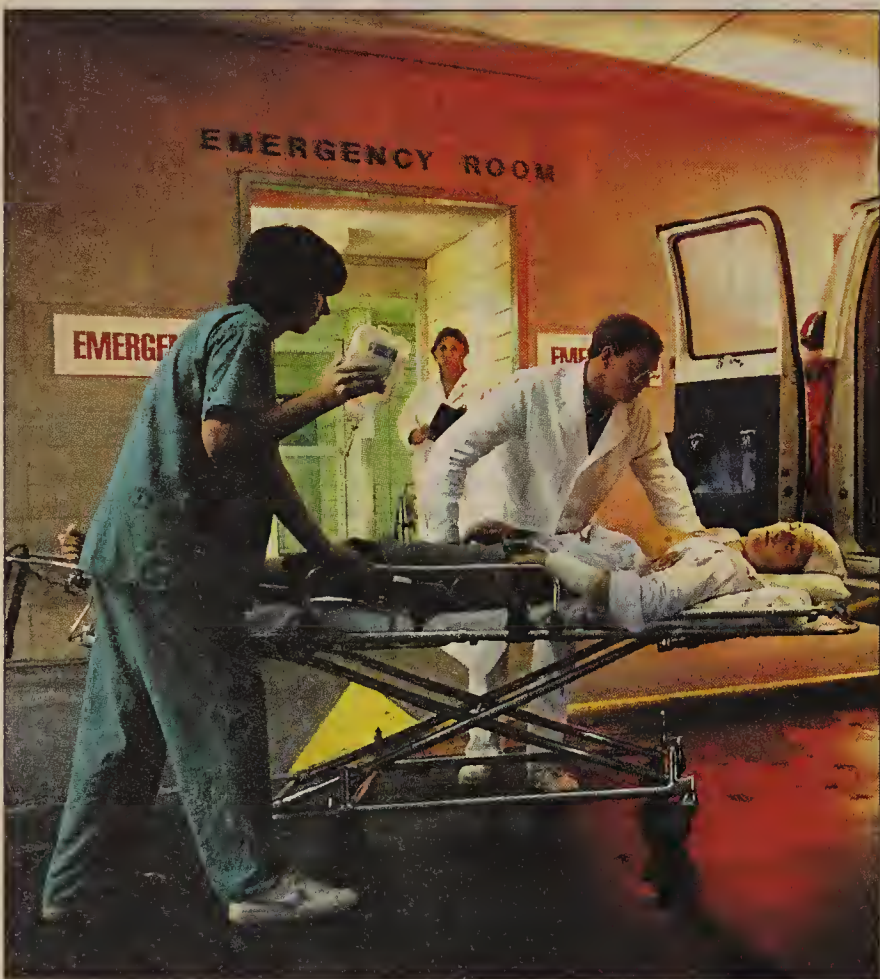
Although he declined to answer any specific questions about the FCC's investigation into Tariffs 12 and 15, Patrick said he had devoted significant resources to the matter and expected to "make progress in the not-too-distant future in those areas."



Dennis Patrick

"ACC's Ethernet bridge guarantees we'll have access to vital patient records in critical situations."

Edward Babakanian
Vice President/Information Systems, CHCC



Community Hospitals of Central California (CHCC) stores vital patient information in a distributed database at one of its three acute-care facilities. Doctors, nurses, and support people depend on this information to help them provide effective patient care.

It's absolutely imperative all three sites have access to these records 24 hours a day, 365 days a year.

"We needed a way that would ensure if one link went down, traffic would re-route through a secondary source." By connecting the sites with ACC remote Ethernet bridges, CHCC now has the redundant, high-performance network it needs.

CHCC increased reliability without increasing cost. It replaced multiple analog lines with one digital line and installed ACS 4030 remote Ethernet bridges from ACC.

But that's not all. After looking at other bridges, CHCC chose the ACS 4030 because "it gave us exactly what we needed for a third of the price."

Worldwide, MIS managers depend on ACS 4030s to provide continuously reliable links between their remote Ethernets. If you want to extend your Ethernets, call 1-800-444-7854 today to learn more about ACC's complete line of bridge products.

Patrick is reported to be a strong supporter of both tariff filings.

Patrick also said he expects his successors to continue with the drive toward deregulation. "I don't think that we're going to see any substantial slowing in forward progress because we can't. Technology and the public interest are driving these changes, and we as regulators are in the position of responding."

He said he strongly urges the adoption of price cap regulation for local exchange carriers and is optimistic that future FCC commissioners will move ahead with such a plan. "I would have liked to put [price caps] over the top for both AT&T and the [local exchange carriers], but I expect we will continue to move forward on the [local exchange] piece in the future," he said.

Several FCC staff members said that even though Patrick has decided to leave, he is unlikely to abandon efforts to see Tariffs 12 and 15 approved. Tariff 12, which is scheduled to be voted on this week, is said to be in jeopardy in its current form ("Common Carrier Bureau calls for Tariff 12 rejection," *NW*, April 3).

Sources said, however, that the commission could approve the tariff if AT&T agrees to submit revisions making it generally available to any customer that can meet volume levels and time commitments. A decision on Tariff 15 is apparently further away, but if Tariff 12 is rejected, it could decrease the chances of Tariff 15 approval, sources at the FCC said. □

Anheuser-Busch taps LAN for response

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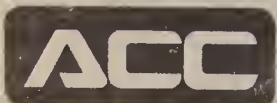
riety of functions in addition to tracking problems encountered by distributors.

The network is also used to schedule meetings, perform industrial design of warehouses for distributors and conduct order entry for the sale of personal computers and software to distributors.

"The network has made our own business much more productive," Sleight said. "Before we installed the PIP net, we had one dedicated employee to support 150 wholesale customers. Now, with the network in place, we only need two support persons for over 600 customers."

The PIP network also serves as a backup for Anheuser-Busch's electronic data interchange network, ensuring that distributor orders sent through the EDI net are answered promptly, Sleight said.

PIP operators can also check the mainframe-based EDI data bases by communicating with the processors through the Irmalan Gateway. □



Advanced Computer Communications
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Your Interconnectivity Source

HP to certify T-1 gear for its X.25 switches

continued from page 2

HP will also increase PPN network reliability with a scaled-down version of its Auxiliary Service Processor (ASP). The ASP is designed to off-load call-processing functions needed to create PPN virtual circuits from the central network control processor (NCP), an HP 9000 minicomputer.

The new mini-ASP includes a circuit board and 20M-byte disk drive that occupies two slots in a 12-slot switch chassis of HP's biggest packet switch, the Model 80, leaving the other slots free for line interface cards. The mini-ASP costs \$17,000. The regular ASP, with a 55M-byte disk drive, occupies 10 slots and costs \$34,000.

The lower cost version will enable users to extend call-processing tasks to more nodes, an important step in keeping wide-area networks operational in case the central NCP fails. If the NCP should fail, the mini-ASPs can still set up calls and store usage information, according to O'Farrell.

"The more you distribute that real-time network control, the less impact any single failure has in terms of the number of users impacted," Emerson said. The mini-ASP costs \$17,000 and will be available in the second half of this year.

The company is also expected to introduce the HP 2335A X.25 multiplexer, a replacement for the existing 2334A. The new device supports four to 16 ports that link terminals and printers to remote processors.

Prices range from \$2,550 to \$5,250, which is almost 20% less than the cost of the 2334A. HP also claimed the new model is 66% more reliable than the 2334A. The multiplexer is available now.

On the network management side, HP is expected to announce the adoption of its OpenView user interface for the PPN network management system, which now runs on MS-DOS-based microcomputers. OpenView uses graphics, windows and menus to simplify net management tasks, according to O'Farrell.

The microcomputer-based control console will emulate an HP network operator console, which it is designed to replace. Shifting the console to a microcomputer is the first step in migrating PPN network management to OS/2- or Unix-based multitasking workstations supporting OpenView, O'Farrell said.

The lower cost Auxiliary Service Processor will enable users to extend call-processing tasks to more nodes.

▲▲▲

The company is also expected to roll out remote device control software. This package provides tools to let users create customized screens on the net management system. With these screens, users can centrally manage non-HP devices in the packet network.

Finally, HP is expected to announce HP Advanced Research Projects Agency Services. This package lets users copy raw statistical data from the net management system to remote HP minicomputers for off-line processing and analysis. ■

Server lets users access varied DBMSs

continued from page 7

A variety of Oracle tools can be used to create front-end workstation applications that work with Oracle Server for VINES. Applications for novice users include Oracle for 1-2-3, which links Lotus Development Corp.'s Lotus 1-2-3 spreadsheets to Oracle data bases; SQL*QMX, a query-by-example user interface; and Easy*SQL, an interface for occasional users.

Oracle and Banyan said Oracle Server will provide more value than Microsoft's SQL Server.

▲▲▲

Oracle Quicksilver recompiles existing dBase applications so they can be used as front-end applications with the Oracle Server for VINES.

No other vendors have announced specific applications that work with the new data base server, but they do not have to, according to Pat House, director of marketing programs for Oracle. House said that a workstation-based application or DBMS package that is written to the SQL*Net component of Oracle's SQL*Star software can work with any Oracle relational DBMS.

Microcomputer data base companies that are developing front ends to Oracle in-

clude Borland International, Inc., GUPTA Technologies, Inc. and Revelation Technologies, Inc. House predicts that there will be many more companies developing front ends by the end of the year.

Microsoft is ahead of Oracle in the third-party support game, having already convinced virtually every significant software developer to write front ends for SQL Server.

But Oracle and Banyan said their product will provide more value than SQL Server. SQL Server is designed for OS/2, a 16-bit operating system native to the 80286 microprocessor, while the Oracle Server for VINES/386 product exploits the 32-bit architecture of the 80386, which gives users of the Oracle/Banyan product better performance, the companies said.

Oracle's Bolt said a more important capability is the product's ability to access Oracle relational DBMSs residing on other systems.

For example, a VINES/386 server that includes Banyan's TCP/IP Routing Option can use Oracle Server for VINES as a gateway to any version of Oracle running on a Transmission Control Protocol/Internet Protocol host.

By contrast, while Microsoft's SQL Server is an OS/2 version of a data base engine Sybase had developed for a variety of mini-computer platforms, it cannot talk to Sybase's minicomputer relational DBMS.

Oracle Server for VINES is available from both Oracle and Banyan and is priced at \$4,999 per server. Oracle is located in Belmont, Calif., and Banyan is headquartered in Westborough, Mass. ■

Net upgrade disrupts MCI 800 service

continued from page 1

However, some users were critical of the carrier for failing to respond to their complaints more quickly.

"We lost critical 800 service in our headquarters building for several hours," said a communications manager for a fast-food chain who asked not to be named. "But we didn't hear from MCI until three hours after we first reported our problem."

"You can yell and scream at MCI vice-presidents all you want — which I did — but there's very little you can actually do about the problem," the manager said.

The data base conversion enabled MCI to provide enhanced 800 service features, including call routing by time of day and day of week, advanced alternate routing and extended call coverage, which permits users to receive 800 calls from several foreign countries.

No warning

Analysts said MCI should have told users before it began the data base conversion process.

"MCI underestimated the size of the project and the effect it might have on 800 customers," said Steve Sazegari, senior telecommunications analyst for Dataquest, Inc., a communications consulting and research firm in San Jose, Calif.

Sazegari said users affected by the outage that rely heavily on phone-in orders, such as national telemarketing service bureaus, may take legal action against the carrier.

"Every lost call means lost business for these 800 users. I wouldn't be at all surprised if some of the larger telemarketing companies eventually decide to sue MCI," Sazegari said.

Considered switching carriers

Although the manager for the fast-food chain said he is not contemplating legal action, he considered replacing MCI 800 service with service from AT&T or US Sprint Communications Co. but eventually decided against it.

"Our 800 number has high visibility. Changing numbers probably wouldn't be a good business decision," he said.

Karen Davis, telecommunications supervisor for Kemper Corp. of Long Grove, Ill., said her firm also experienced 800 service outage.

"We had problems with 800 service, but they were not for any great length of time," she said.

Several users, including Vanderbilt University in Nashville, lost multiple 800 numbers during the outage, according to MCI's Crawford.

Ted Vagelos, assistant director of telecommunications for the school, said the outage lasted about 20 minutes and took place during the weekend.

The service disruption "could have a big effect on companies that need 24-hour-a-day, seven-days-a-week 800 service," Vagelos said. MCI was quick to restore 800 service to Vanderbilt, he added. ■

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IBM offers new line of products

continued from page 1

ket research firm in Mountain View, Calif.

Prior to this announcement, IBM resold third-party EDI conversion software to its customers.

The company's decision to produce its own software shows it is committed to meeting customers' EDI needs, said David Taylor, director of interenterprise systems for Gartner Group, Inc., a market research firm in Stamford, Conn. "[IBM] didn't have to announce these products because they could have continued selling other vendors' products," he said.

The company announced versions of DataInterchange for MVS/ESA- and MVS/XA-based mainframes, Application System/400 (AS/400), System/36 and System/38 minicomputers, as well as for Personal System/2 microcomputers running OS/2. A future version will run on VM-based mainframes.

IBM will also provide technical assistance to customize the products to work with existing EDI applications used by customers to create electronic documents such as purchase orders and invoices. DataInterchange can be configured to convert proprietary document formats to ANSI X12 or United Nations/EDI for Administration, Commerce and Transport (EDIFACT) formats. ANSI X12 defines formats for EDI interchange within the U.S., and EDIFACT defines formats for international EDI.

The documents can be transmitted across a network to a trading partner, where the IBM software or non-IBM EDI conversion software will convert the document to the format used by the receiving company.

Besides support for ANSI X12 and EDIFACT, IBM said the System/3X and AS/400 versions of DataInterchange will also convert proprietary document formats to the Uniform Communications Standard (UCS) and Transportation Data Communications Committee (TDCC) standard formats.

The UCS and TDCC formats were devel-

oped prior to ANSI X12. UCS is widely used in the retail industry, and TDCC is used in the transportation industry. UCS and TDCC support will be added to future versions of the mainframe- and Personal System/2-based versions of DataInterchange, IBM said.

Each of the new DataInterchange packages can be used with IBM's other EDI products, including its Communicator Series of communications software and its EDI network service provided over the Information Network. The software can also be used with other vendors' communications software and EDI network services, as well as with private networks.

Gartner Group's Taylor said he expects IBM's announcement to spur major vendors such as Digital Equipment Corp. and Hewlett-Packard Co. to offer competitive products. This would benefit users by in-

creasing EDI software options, and it could even drive down the prices of such products.

Analysts said IBM's announcements may help speed acceptance of EDI. "The fact that IBM is now going to encourage its 2,000 suppliers to utilize EDI is certainly another spur to the whole development of EDI," said David Shaw, president of Constell Group, Inc., a Tenafly, N.J.-based EDI consulting firm.

Other observers agreed. "Everyone in this business is pleased when large companies like IBM make a serious commitment to EDI," said Nicole Willenz, manager of EDI consulting and development for Price Waterhouse in Chicago. Willenz, who is also chairman of the North American EDIFACT Board and a delegate to the United Nations' EDIFACT committee, said she was pleased that IBM chose to support the

emerging EDIFACT standard in its new products.

IBM's DataInterchange/MVS is available now and has an initial license fee ranging from \$14,750 to \$38,000, depending on configuration. It also carries an annual fee ranging from \$2,050 to \$5,200. DataInterchange/2 for Personal System/2s is priced at \$4,000 per copy and will ship in the first quarter of 1990.

The minicomputer versions are scheduled to ship in the third quarter of 1989. DataInterchange/400 for the AS/400 has an initial license fee ranging from \$6,600 to \$18,150 and an annual fee of between \$900 and \$2,475. DataInterchange System/38 carries an initial fee of \$11,250 and an annual fee of \$1,550, and DataInterchange System/36 has an initial license fee of \$6,600 and an annual fee of \$900. ■

Nets link remotes at channel speeds

continued from page 1

for resource sharing," said Carl Russo, vice-president of data network products for AT&T Paradyne. To support this, he said, users are turning to remote channel extender products that can take on some of the functions of a network switch.

Channel extenders that route traffic to multiple remote sites at 1.544M bit/sec T-1 or 45M bit/sec T-3 speeds are the latest rendition of these products.

Traditional channel extenders enable users to link peripherals such as disk drives and cluster controllers to 24M bit/sec mainframe channels at distances of up to a few miles. This is far greater than the 400-ft. range of the bus-and-tag cables generally used to connect devices to IBM mainframes, but extenders are required on both ends of the link.

A second generation of channel extenders enables users to locate hosts and peripherals in different cities by using high-speed point-to-point connections. When the host needs to communicate with a remote peripheral, it encapsulates the data in a packet with the target device's subchannel address and routes it to the ex-

tender serving that particular remote site.

With the newer switching extenders, users attach a channel to a single local extender, which uses host- or extender-resident software to examine the subchannel address of packets. It then routes packets via the appropriate remote link. This technique reduces the number of extenders needed to establish links among sites.

By building a full mesh network of channel extenders connected via T-1 or T-3 circuits, switching channel extenders also enable users to route traffic around failed communications links.

Technology catching on

Some channel extender vendors, including Network Systems Corp. and Computer Network Technology Corp. (CNT), said the technology to support wide-area channel networking has been around for the past few years but is only now being widely implemented. AT&T Paradyne said it recently enhanced its Pixnet XL line to support switching functions.

"The utilization of this capability in the past few years has grown," said Frantz Corneille, marketing manager at Network Systems.

Network Systems' Remote Device System channel extender product line, introduced in 1985, supports switching functions when used in conjunction with the company's software running on IBM MVS- or VM-based mainframes. That software examines subchannel addresses and routes data to the extender supporting the T-1 or T-3 link to the intended peripheral.

CNT has also observed an increasing awareness of the wide-area channel networking concept. According to Bob Lutnicki, director of marketing at CNT, a few large users are starting to replace some IBM Systems Network Architecture links between remote data centers with wide-area channel nets. But at first, Lutnicki said, "We found that, in the IBM world, this concept of intelligent channel networking was pretty much a foreign one."

CNT, which was started by former Network Systems employees, uses software on its ChannelLink extender products to perform network routing. ChannelLink receives data from multiple channels, stores it in a random-access memory buffer, examines the subchannel addresses and routes the data over the appropriate T-1 or T-3 remote link.

AT&T Paradyne's approach to switching channel extenders is similar to CNT's. The company uses extender-resident software that emulates channel functions and routes traffic to other Pixnet XL products in remote locations via T-1 or T-3 lines.

These three vendors are not the only ones addressing the wide-area channel networking market. "We've seen our customers moving toward the idea of channel networking," said Neil Unger, product

With the newer switching extenders, users attach a channel to a single extender.

▲▲▲

manager for Data Switch Corp.'s Host Net local channel networking system.

Data Switch is currently developing products to support wide-area channel networking, he said. The products will work with its Host Net Model 9088, which provides circuit-switched connections among as many as 16 local host channels.

Unger said his company is working on remote extenders that can be integrated into the Host Net product. With this integration, a local channel can establish a 24Mbit/sec circuit-switched connection to an internal extender. The extender is capable of routing the data via a T-1 or T-3 line to a stand-alone extender or another Host Net product at any remote site.

Currently, users need to attach a stand-alone extender to a Host Net port when establishing a link with a remote site. ■

Early user signs on for Definity PBX

continued from page 4

switching systems product management director for AT&T, said the price of the Generic 1 is roughly equal to that of a comparably equipped System 75.

The Generic 1 can support AT&T's Integrated Services Digital Network Primary

Rate Interface card. A switch equipped with the card will enable the user to take advantage of Primary Rate Interface-based Information Forwarding-2, AT&T's automatic number identification and Call-By-Call Service Selection features.

Parker Hannifin has no immediate plans to equip its Generic 1 with the ISDN Primary Rate Interface card, according to Schulli. ■

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Unforeseen problems that can put the bite on your network

How to head off hackers

BY TOM FERMAZIN

You dial the number of your office voice mail system to check for messages. At the prompt, you enter your extension number and password. The system tells you your password is incorrect. You try again, and again the system rejects your password.

Frustrated, you call the voice mail system administrator. There is a tone of concern in her voice. You are not the first to call. Other employees are having the same problem.

The next morning, a technician arrives. He runs diagnostics and finds that the system is operating properly. Then he looks at the traffic reports and discovers the cause of the problem: Your voice mail system has been hijacked by hackers!

This frightening scenario has happened and will continue to happen if companies do not put security safeguards into place.

One firm's nightmare

"We had a toll-free 800 number for our employees in the field to call in on [and retrieve] messages in their voice mailboxes," says a voice mail system administrator who requested anonymity. "I've since learned that you are leaving yourself wide open to hackers [by using] an 800 number. They have a PC program called Mailbox Hack that they claim can hack out a nine-digit security code in under six hours."

"The hackers programmed their PCs to keep dialing our voice mail number, systematically trying different passwords until they found one that worked," he says. "And we were paying for the calls."

"Once the hackers have gotten into a mailbox, it seems like they can do almost anything they want," he adds. "They set up their own password, and you've lost control of that voice mailbox until your system administrator deletes [the password] manually."

While the initial challenge of breaking into the voice mail system may be enough to attract some hackers, the administrator, who works for a large West Coast wholesale grocer, notes that most have more nefarious motives.

"The hackers used our system as a message center," he says. "They were advertising drugs and stolen credit cards, as well as just using it to leave regular messages for one another."

Once hackers are discovered, companies must figure out not only how to get rid of them, but how to prevent future break-ins.

"Twice each week, we had a receptionist call each of the mailboxes. If the personal greeting sounded suspicious, we immediately closed that mailbox," explains the administrator.

"We also changed our 800 number. For the time being, it doesn't appear on any electronic bulletin boards."

Manufacturer's point of view

"The best weapon against this sort of thing is an awareness by the customer that these situations can occur and that there are steps you can take up front, when the system is [being installed], to head off problems," says Margaret Miller, director of distribution support and education for VMX, Inc., a voice-messaging system manufacturer in San Jose, Calif.

Miller says her company's Opcom Dial system has specific features that address security concerns. "Among the reports generated by the Opcom system is one that lists mailboxes that have security codes established and those that do not. This alerts the system manager to any mailboxes that are without password protection."

"Another provides an automatic default security code for any new mailbox that is established," Miller says. "The system administrator can periodically change this password, and each new mailbox receives the password that is current at the time of setup. Mailbox users are instructed to replace the default code with their own personal code."

Fermazin is senior telecommunications analyst for Amoco Corp. in Chicago.

How can users protect their systems from hackers? "If you insist on toll-free access, try to segregate a group of mailboxes that the 800 lines call into," Miller suggests. "Monitor them more closely than the rest. Passwords should be longer than two digits. Six is probably a good compromise between too few for security reasons and too many for the convenience of the users. Encourage users to change their passwords periodically."

"The majority of hackers take the path of least resistance," notes Jonathan Visbal, senior product manager for Octel Communications Corp., a voice-messaging system manufacturer in Milpitas, Calif. "If users fail to assign passwords to mailboxes, hackers will go after those first. If passwords are only one or two digits long, they will hack out those next. If mailboxes are left unused for long periods of time, users are less likely to be aware of unusual activity."

"We recommend that [passwords] be changed every quarter," he continues. "Robust security codes for system administrator mailboxes should have at least 10 digits. Obvious passwords like '111' or '1234' should never be used."

"Today's systems have statistical reports that tell administrators a great deal about what's happening in their system. They should make use of these reports regularly," Visbal says.

Some voice mail users have opted for an extra layer of security that voice-messaging systems can't provide. Information Innovators in Virginia Beach, Va., manufactures Telegate, which is designed to prevent unauthorized access to Direct Inward System Access (DISA) in the private branch exchange.

"Telegate sits between the 800 lines and the voice-messaging system," explains Paul Flannagan, a company spokesman. "Any outside caller wishing to gain access to voice mail must first enter a security code. The length can vary and is established by the system administrator."

"The system monitors the number of times each code is used each day," Flannagan says. "Once a threshold [set by the system administrator] is reached, further attempts are disallowed."

What if you find yourself suddenly faced with hackers in your voice mail system? One source to contact is Rami Abuhamdeh, executive director of the Communications Fraud Control Association (CFCA) in McLean, Va.

"Our purpose is to raise the level of public awareness of the existence of toll fraud," Abuhamdeh explains. "We recently sponsored a symposium that addressed the issue of voice mail fraud. The proliferation of toll-free numbers and DISA services makes it far easier and safer for hackers to prey on private networks than common carriers."

Abuhamdeh notes that, while the CFCA is not a consulting firm, "We can point victims of fraud in the right direction to get assistance through our membership." The CFCA can be reached at (703) 848-9768.

The last word

"The dilemma for system administrators is a question of balance," says Dusty Sykes, president of Vanguard Communications Corp., a Morristown, N.J.-based management consulting and marketing firm specializing in voice-messaging products. "The harder you make it for hackers to get into your system, the less likely you are to have problems. On the other hand, the more complicated you make it for authorized users, the less they will use it." ■

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